

COMPLAINANT'S TESTIMONY.

Circuit Court of the United States.

MASSACHUSETTS DISTRICT.

IN EQUITY.

ROSS WINANS *vs.* THE EASTERN RAILROAD
COMPANY.

EVIDENCE FOR COMPLAINANT.

OCTOBER TERM, 1853.

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BOSTON:

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CIRCUIT COURT OF THE UNITED STATES

FOR THE DISTRICT OF MASSACHUSETTS.

ROSS WINANS vs. THE EASTERN RAILROAD COMPANY,
IN EQUITY.

BILL OF COMPLAINT.

*To the Honorable the Judges of the Circuit Court of the United States
for the first Circuit and District of Massachusetts.*

YOUR Orator, ROSS WINANS, a resident in the city of Baltimore, and
a citizen of the State of Maryland, and a citizen of the United States,
brings this bill against the

EASTERN RAILROAD COMPANY,

a corporation duly incorporated under and by virtue of the laws of
the State of MASSACHUSETTS, and located and doing business in said
State, defendants; and thereupon your Orator complains and says,
that heretofore, to wit, on the first day of October, in the year one
thousand eight hundred and thirty-four, at Baltimore aforesaid, your
Orator, then being a citizen of said United States, was the true and 2
original inventor of a new and useful improvement in the construction
of cars or carriages intended to run on railroads, not known or used
before his application for the Letters Patent hereinafter mentioned,
and which improvement is particularly described in the Schedule at-
tached to and making part of said Letters Patent hereinafter set
forth; and your Orator, being such true and original inventor of said
improvement, did, on or about the day last named, at the city of
Washington, apply to the Secretary of State of said United States
for Letters Patent to be granted to him by said United States, secur-
ing to him the said improvement, according to the statute in such 3
case made and provided, and did then and there present a petition to
the Secretary of State of said United States, signifying a desire of
obtaining an exclusive property in said improvement, and praying that
Letters Patent for that purpose might be granted to him therefor, and
did duly make oath that he verily believed he was the true inventor
and discoverer of said improvement, and did then and there deliver
to and file in the office of the said Secretary of State a written
description of his said improvement, and of the manner of using

- 4 and applying the same, and explaining the principle and the usual modes of applying the said improvement and the principle thereof, and did, as he believes, accompany the said description with drawings and written references, in such full, clear, and exact terms, as to distinguish said improvement from all other things before known, and so as to enable any person skilled in the art with which said improvement was most nearly connected, to make and use the same, which said description was duly signed by your Orator and attested by two witnesses, and did then and there pay into the treasury of the said
- 5 United States the sum of thirty dollars, and duly deliver a receipt for the same, and did then and there, fully and in all respects, comply with all the requisites of the law in such case made and provided, to enable him to obtain Letters Patent for said improvement; and thereupon the said Secretary of State caused Letters Patent to be made out in the name of the said United States, bearing date the first day of October, in the year one thousand eight hundred and thirty-four, which said Letters Patent, having been duly examined and certified pursuant to law by Benjamin F. Butler, then Attorney-General of
- 6 the said United States, were afterwards and on the said first day of October, 1834, at Washington aforesaid, duly signed and attested by Andrew Jackson, then President, and John Forsyth, then Secretary of State of said United States, and the seal of the United States thereunto duly affixed by the said Secretary of State, and thereupon the said Letters Patent, having been first duly recorded, were afterwards, at the time and place last mentioned, duly issued and delivered to your Orator; in and by which Letters Patent, the said United States
- 7 of America, after reciting that your Orator had alleged that he had invented a new and useful improvement in the construction of cars or carriages intended to run on railroads, which had not been known or used before his application; had sworn that he verily believed that he was the true inventor or discoverer of said improvement, had paid into the Treasury of the United States the sum of thirty dollars, delivered a receipt for the same, and presented a petition to the Secretary of State, signifying a desire of obtaining an exclusive property in said improvement, and praying that a patent might be granted for that purpose, did grant, according to law, to your Orator, his heirs, administrators, or assigns, for the term of fourteen years from the first
- 8 day of October, 1834, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof was and is given in the schedule annexed to said Letters Patent and made a part thereof; as by the said Letters Patent now in the possession of your Orator ready to be produced as the Court may direct, or by a duly authenticated copy thereof, ready to be produced and proved as the Court may direct, will more fully, and at large, appear, and to which for greater certainty
- 9 your Orator prays leave to refer.

And your Orator alleges that the description of said improvement so patented as aforesaid, as contained in the said schedule so annexed to and made part of said Letters Patent, is in the words and figures following, viz:—

SCHEDULE "A."

*The Schedule referred to in these Letters Patent, and making part 10
of the same, containing a description, in the words of the said
ROSS WINANS himself, of his improvement in the construction
of Cars or Carriages, intended to run upon Railroads.*

To all whom it may Concern:— Be it known, that I, Ross 11
WINANS, civil engineer, of the city of Baltimore, in the State
of Maryland, have invented a new and useful improvement in
the construction of cars or carriages, intended to travel upon
railroads; which improvement is particularly adapted to pas-
senger cars, as will more fully appear by an exposition of the
difficulties heretofore experienced in the running of such cars
at high velocities, which exposition I think it best to give in
this specification, for the purpose of exemplifying the more
clearly the object of my said improvement.

In the construction of all railroads in this country, which 12
extend to any considerable distance, it has been found necessary
to admit of lateral curvatures, the radius of which is sometimes
but a few hundred feet; and it becomes important, therefore, so
to construct the cars, as to enable them to overcome the diffi-
culties presented by such curvatures, and to adapt them for
running with the least friction practicable, upon all parts of the
road. The friction to which I now allude is that which arises
from the contact between the flanches of the wheels and the
rails, which, when it occurs, causes a great loss of power and a
rapid destruction of, or injury to, both the wheel and the rail,
and is otherwise injurious.

The high velocities attained by the improvements made in 13
locomotive engines, and which are not only sanctioned but
demanded by public opinion, render it necessary that certain
points of construction and arrangement, both in the roads and
wheels, which were not viewed as important at former rates of
travelling, should now receive special attention. The greater
momentum of the load and the intensity of the shocks and
concussions, which are unavoidable, even under the best con-
structions, are among those circumstances which must not be
neglected, as the liability to accident is thereby not only greatly
increased, but the consequences to be apprehended much more
serious.

- 14 The passenger and other cars in general use upon railroads have four wheels, the axles of which are placed from three and a half to five feet apart; this distance being governed by the nature of the road upon which they run, and other considerations.
- 15 When the cars are so constructed that the axles retain their parallelism, and are at a considerable distance apart, there is a necessary tendency in the flanches of the wheels to come into contact with the rails, especially on the curvatures of least radius, as the axles then vary more from the direction of the radii. From this consideration, when taken alone, it would appear to be best to place the axles as near to each other as possible, thus causing them to approach more nearly to the direction of the radii of the curves and the planes of the wheels to conform to the line of the rails.
- 16 There are, however, other circumstances which must not be overlooked in their constructions. I have already alluded to the increased force of the shocks from obstructions at high velocities; and, whatever care may be taken, there will be inequalities in the rails and wheels, which, though small, are numerous, and the perpetual operation of which produces effects which cannot be disregarded. The greater the distance between the axles, while the length of the body remains the same, the less is the influence of these shocks or concussions; and this has led, in many instances, to the placing them in passenger cars, at or near their extreme ends. Now, however, a compromise is most commonly made between the evils resulting from a considerable separation and a near approach, as, by the modes of construction now in use, one of the advantages must be sacrificed to the other.
- 17 But it is not to the lateral curvatures and inequalities of the road alone that the foregoing remarks apply. The incessant vibration felt in travelling over a railroad is mainly dependant upon the vertical motion of the cars, in surmounting those numerous though minute obstructions which unavoidably exist. The nearer the axles are placed to each other, the greater is the effect of this motion upon the passengers, and the greater its power to derange the machinery and the road. It becomes very important, therefore, both as regards comfort, safety, and economy, to devise a mode of combining the advantages derived from placing the axles at a considerable distance apart, with those of allowing them to be situated near to each other.
- 18 It has been attempted, and with some success, to correct the tendency of the flanches to come into contact with the rails on

curved and other parts of the road, by making the tread of the wheel conical; and, if the travelling upon railroads was not required to be very rapid, this would so far prove an effectual corrective, as the two rails would find diameters upon the wheels which would correspond with the difference in length, the constant tendency to deviation being as constantly counteracted by this construction; but, at high velocities, the momentum of the body in motion tends so powerfully to carry it in a right line, 19 as to cause the wheel on the longer rail to ascend considerably above that part of the cone which corresponds therewith. The consequence of this is a continued serpentine motion, principally, but not entirely, in a lateral direction; nor is this confined to the curved parts of the road, but it exists to an equal or greater extent upon those which are straight, especially when the axles are near to each other, the irregularities before spoken of constantly changing the direct course of the wheels, whilst there is no general curvature of the rails to counteract it. To avoid this effect, and the unpleasant motion and tendency to derangement consequent upon it, an additional motive is furnished for placing the axles at a considerable distance apart.

The object of my invention is, among other things, to make 20 such an adjustment or arrangement of the wheels and axles, as shall cause the body of the car or carriage to pursue a more smooth, even, direct, and safe course, than it does as cars are ordinarily constructed, both over the curved and straight parts of the road, by the before-mentioned desideratum of combining the advantages of the near and distant coupling of the axles and other means to be hereinafter described.

For this purpose, I construct two bearing carriages, each with 21 four wheels, which are to sustain the body of the passenger or other car, by placing one of them at or near each end of it, in a way to be presently described. The two wheels on either side of these carriages are to be placed very near to each other: the spaces between their flanches need be no greater than is necessary to prevent their contact with each other. These wheels I connect together by means of a very strong spring, — say double the usual strength employed for ordinary cars, — the ends of which springs are bolted, or otherwise secured, to the upper sides of the boxes, which rest on the journals of the axles; 22 the longer leaves of the springs being placed downwards, and surmounted by the shorter leaves. Having thus connected two pairs of wheels together, I unite them into a four-wheel bearing carriage, by means of their axles and a bolster of the proper

length, extending across between the two pairs of wheels from the centre of one spring to that of the other, and securely fastened to the tops of them. This bolster must be of sufficient strength to bear a load upon its centre of four or five tons. Upon this first bolster I place another of equal strength, and connect the two together by a centre pin or bolt, passing down through them, and thus allowing them to swivel or turn upon each other in the manner of the front bolster of a common road wagon. I prefer making these bolsters of wrought or cast iron: wood, however, may be used. I prepare each of the bearing carriages in precisely the same way.

- 23 The body of the passenger or other car I make of double the ordinary length of those which run on four wheels, and capable of carrying double their load.

This body I place so as to rest its whole weight upon the two upper bolsters of the two before-mentioned bearing carriages or running gear. I sometimes place these bolsters so far within the ends of the body of the car as to bring all the wheels under it; and, in this case, less strength is necessary in the car-body, than when the bolster is situated at its extreme ends. In some cases, however, I place the bolster so far without the body of the car, at either end, as to allow the latter to hang down between the two sets of wheels, or bearing carriages, and to run, if desired, within a foot of the rails.

- 24 When this is done, a strong frame-work projects out from either end of the car or carriage body, and rests upon the upper bolsters of the two bearing carriages. This last arrangement, by which the body of the car is hung so low down, manifestly affords a great security to the passengers, exempting them in a great degree from those accidents to which they are liable when the load is raised. Several bodies may be connected, or rest on a common frame, and be supported on the bearing carriage, in a manner similar to that of a single body.

- 25 When the bolsters of the bearing carriages are placed under the extreme ends of the body, the relief from shocks and concussions, and from lateral vibrations, is greater than it is when the bolsters are placed between the middle and the ends of the body; and this relief is not materially varied by increasing or diminishing the length of the body, while the extreme ends of it continue to rest on the bolsters of the bearing cars, the load being supposed to be equally distributed over the entire length of the body.

- 26 Although I prefer the use of a single spring to a pair of wheels as above described, instead of the ordinary spring to each

wheel, and consider it as more simple, cheap, and convenient, than any other arrangement; the end which I have in view may, nevertheless, be obtained by constructing the bearing carriages in any of the modes usually practised, provided that the fore and hind wheels of each of them be placed very near together; because the closeness of the fore and hind wheels of each bearing carriage, taken in connection with the use of two bearing carriages coupled remotely from each other as can conveniently be done, for the support of one body, with a view to the objects and on the principles herein set forth, is considered 27 by me as a most important feature of my invention; for by the contiguity of the fore and hind wheels of each bearing carriage, while the two bearing carriages may be at any desirable distance apart, the lateral friction from the rubbing of the flanches against the rails is most effectually avoided, whilst, at the same time, all the advantages attendant upon placing the axles of a four-wheeled car far apart are thus obtained.

The bearing of the load on the centre of the bolster, which 28 also is the centre of each bearing carriage, likewise affords great relief from the shocks occasioned by the percussions of the wheels on protuberant parts of the rails, or other objects, and from the vibrations consequent to the use of coned wheels; as the lateral and vertical movements of the body of the car resulting from the above causes are much diminished. The two wheels on either side of one of the bearing carriages may, from their proximity, be considered as acting like a single wheel; and as these two bearing carriages may be placed at any distance from each other, consistent with the required strength of the body of the car, it is evident that all the advantage is obtained which results from having the two axles of a four-wheeled car at a distance from each other, whilst its inconveniences are avoided.

Another advantage of this car compared with those in com- 29 mon use, and which is viewed by me as very important, is the increased safety afforded by it to passengers; not only from the diminished liability to breakage, or derangement in the frame work, but also from the less disastrous consequences to be apprehended from the breaking of a wheel, axle, or other part of the running gear, as the car-body depends, for its support and safety, upon a greater number of wheels, and bearing points on the road.

I do not claim, as my invention, the running of cars or car- 30 riages upon eight wheels, this having been previously done; not, however, in the manner or for the purposes herein described, but merely with a view of distributing the weight carried, more

evenly upon a rail, or other road, and for objects distinct in character from those which I have had in view, as hereinbefore set forth. Nor have the wheels, when thus increased in number, been so arranged and connected with each other either by design or accident, as to accomplish this purpose. What I claim, therefore, as my invention, and for which I ask a patent, is the before-described manner of arranging and connecting the eight wheels which constitute the two bearing carriages with a railroad car, so as to accomplish the end proposed by the means set forth, or by any others which are analogous and dependent upon the same principles.

ROSS WINANS.

Witnesses—G. BROWN,
JNO. H. B. LATROBE.

And your Orator further says, that, on obtaining the Letters Patent 31 for said invention, he took measures to make it publicly known, and to introduce his improvement into general use. He published the specification in the American Railroad Journal, a paper published in New York City, having an extensive circulation among all parties interested in the existing and projected railroads of the country.

He procured its adoption on the Baltimore and Ohio Railroad, 32 where it had been first tried, improved, and perfected by him. He then endeavored to introduce it on the roads leading from Boston. On one of these, the Boston and Lowell in 1835 took and paid him for the license under which they have since been operating it; and the Chief Engineer of another, the Boston and Providence, ordered, at your Orator's instance, cars upon his plan, which were afterwards countermanded from want of confidence in their success,—although this company subsequently adopted, and have ever since been using them.

In the year 1835, he commenced business as a general machinist in 33 Baltimore, and induced the Paterson Railroad Company, in New Jersey, to order a few cars, which he manufactured, in the hope of gaining a reputation for them and promoting their general adoption.

About the same time, he furnished, for the same purpose, several of his improved cars for the Philadelphia, Wilmington, and Baltimore Railroad Company.

But, notwithstanding these efforts on his part, your Orator found 34 many difficulties in the way of the introduction of his improvement into general use. The speed on railroads was then much less than what it afterwards became; the public were contented with the four-wheel cars with which the roads were stocked; the amount of capital invested in them indisposed the several companies to change them; and the unusual size and apparent weight of the new car were not calculated, it would seem, to inspire that confidence which some, even among the most eminent engineers, wanted in their success.

Your Orator shows, however, that the improvement gradually came 35 into favor; and, the New Castle and Frenchtown Turnpike and Railroad Company adopting and refusing to pay for it, a suit was commenced against them in the Circuit Court of the United States for the Maryland District in 1838,—was most thoroughly contested before Chief Justice Taney,—and, although not resulting in a verdict, the Jury failing to agree, it had the effect of inducing the Defendants to pay to your Orator the sum which he had demanded before the action was commenced. It was the means, too, of effecting a settlement with the Philadelphia, Wilmington, and Baltimore Company, which had become associated with the New Castle and Frenchtown Company, and paid your Orator the sum that he would have been willing to receive from them for their use of the said improvement in the first instance.

In the case before Judge Taney, the rulings of the Court were held 36 by your Orator to be so full in his favor, and so wide was the circulation given to them by publication in the newspapers, and so full had been the development of the testimony in his behalf, that he was in hopes that he would have no difficulty in making settlements with

those parties throughout the country who were using his improvement, especially as your Orator was willing to make the amount claimed by him small enough, as he thought, to render it the interest of every company who desired it, to pay him what he asked, rather than incur the annoyance and expense of protracted litigation.

- 37 The first company that your Orator applied to, after the trial above mentioned, under the impressions here stated, was the Baltimore and Susquehanna Railroad Company, the only company, with a road leading out of Baltimore, with which he had not effected a settlement. Small, however, as was the sum claimed by your Orator, the amount offered by them was still less; and, as they fully admitted the value of his improvement, he resolved to prosecute his claim in other quarters, in the hope that a further consideration of the subject would induce them to greater liberality; and therefore, after a negotiation, which extended over a considerable time, and which, like all negotiations with large corporations, acting only through Boards of Directors, meeting at remote intervals, was tedious, uncertain, and protracted, your Orator went to Philadelphia in the year 1840, and employed William M. Meredith, Esq., as his attorney and representative in that city, with power to make settlements with the different railroad companies in Pennsylvania and New Jersey using his improvement.

- 38 And your Orator shows, that, in the year 1841, Mr. Meredith effected a settlement with the Reading Railroad Company, who paid for the license under which they have since been operating, and opened negotiations with the other railroad companies having offices in Philadelphia.

That this business of your Orator's continued in Mr. Meredith's hands, and was the subject of frequent interviews and correspondence between them, until Mr. Meredith accepted a seat in General Taylor's Cabinet, and removed his residence from Philadelphia.

- 39 And your Orator further shows, that the business in which he was engaged in Baltimore, and which was necessary to the support of his family, did not allow him to do more than attempt to carry on the prosecution of his patent right claims by correspondence with Counsel, and occasional and brief visits to them; which he long continued to believe would be sufficient. But the delays which were constantly interposed, the fallaciousness of all negotiations, finally satisfied him of the necessity of placing his patent in the hands of active agents who would make it their personal duty to attend to it, and thus prevent the further sacrifice of his interests, which your Orator little thought would be necessary when he obtained his Letters Patent from the Government in 1834.

- 40 And your Orator further shows, that, in the year eighteen hundred and forty-five, he had employed, as his Counsel, John H. B. Latrobe, Esq., of Baltimore, who had been engaged in the trial already mentioned, and who was fully aware of your Orator's views and desire to prosecute his claim; William M. Meredith, Esq., whom your Orator had employed in Philadelphia in 1840, and who represented your Orator in Pennsylvania and New Jersey; and James G. Wilson, Esq.; the last named of whom acted as his agent in the New England

States; and William H. Seward, Hamilton Harris, George G. Sickles, and Charles D. Gould, Esquires, in New York; Mr. Gould also acting as an agent in promoting the claim;—that, for the use of the parties thus employed, your Orator caused full statements to be prepared of the case and the evidence, as developed at the trial in Baltimore by the Counsel engaged in it, and did, in fact, every thing that he could do personally to sustain his rights.

And your Orator further shows, that, so long as it was possible to avoid it, he postponed litigation. When he at length engaged in it, in 1838–9, he hoped that the result, establishing the law of the case in his favor, accompanied by the fact of payment to him of the sum demanded, even after the failure of the Jury to agree on a verdict, would relieve him from the necessity of going further into the Courts, of the expense and trouble of which, a single trial had already afforded him ample experience; and he accordingly renewed his attempts at negotiation with the powerful corporations then using his improvement, and which he desired to settle with upon moderate terms, as already stated and in succession, without provoking a combination against which he might be powerless. But your Orator found the same difficulties. Sometimes his rights would be admitted, and encouragement given of an early settlement; meetings of Boards had to be waited for; and at last when, after a delay which your Orator had permitted rather than prejudice his cause by importunity, he pressed for a decision, he would be referred to the Courts, and at times informed that there would be less objection to their payment of large amounts upon judgments, with the attendant costs and Counsel fees, than of much less sums for the same claim upon negotiation. And your Orator states these matters herein, and which are the common experience of patentees, that it may be seen why the term of his patent was wasted in vain attempts to make it available.

And your Orator further shows, that after application had been made to various railroad companies using his improvement in 1845, by the Counsel and agents already named, without success, it was determined to bring suits against the railroad companies using the said improvement, in both the Northern and Southern Districts of the New York Circuit, where it was known that there would be a defence of the most strenuous character, and await the result. This was accordingly done in 1846, as hereinafter stated.

And your Orator further shows, that the delays herein detailed operated to prevent his obtaining remuneration for his improvement, and led him to apply for an extension of the term of his Letters Patent under the act of Congress in such case made and provided; which application was opposed on behalf of the New England roads leading from Boston, by the ablest Counsel in Washington. Among the inquiries involved in it, were the originality of the invention, and whether your Orator's failure to obtain "a reasonable compensation for the time, ingenuity, and expense bestowed upon the said improvement, and the introduction of the same into use, proceeded from any neglect or fault on his part." The grant of the extension was a reaffirmance of your Orator's rights as inventor, and his vindication from any charge of neglect in prosecuting them.

- 45 And your Orator further shows, that, from the origin of said invention to the present time, he has always claimed, as he now claims it, to be his own; and that, from the date of the Letters Patent, he has been always ready and desirous to furnish cars constructed upon the plan patented, or to authorize by special license others to make and vend, or to make and use, or to use such cars; that he has never, on any occasion, acquiesced in the manufacture or use of such cars by others without license from him, but that he has at all times, whenever the occasion offered, declared that the manufacture or the use of them, without license from him, no matter by whom or how, was in direct violation of his rights.
- 46 And your Orator further shows, that the said extension was applied for on or about the third day of June, eighteen hundred and forty-eight, at the city of Washington, where your Orator made application in writing to the Commissioner of Patents of the said United States, setting forth that he desired an extension of his said Letters Patent, and the grounds thereof; that your Orator then and there paid the sum of forty dollars to the credit of the Treasury of the said United States, the same as in the case of an original application for a patent, and thereupon the said Commissioner of Patents caused public notice
- 47 of said application to be given according to law, and such proceedings were thereupon had upon said application; that the said Commissioner of Patents did afterwards, and on the 25th day of September in the year 1848, grant an extension of said Letters Patent to your Orator, for the term of seven years from the first day of October, in the year 1848; and the said Commissioner of Patents did then and there by his certificate in writing, endorsed on said Letters Patent, and duly signed by him as such Commissioner, bearing date the 25th day of September, in the year 1848, by virtue of the power in him vested by the acts of Congress in such case made and provided, renew
- 48 and extend said patent, and certify that the same was thereby extended for the term of seven years from and after the expiration of the first term thereof, viz. the first day of October, in the year 1848, as by the said proceedings and the said last-mentioned certificate duly entered of record in the Patent Office of the said United States, or by duly authenticated copies thereof, ready to be produced and proved as the Court may direct, will more fully and at large appear, and to which, for greater certainty and particularity, your Orator prays leave to refer.
- 49 And your Orator says and alleges, that, by virtue of said Letters Patent, and said renewal and extension thereof, your Orator was, from the granting of said Letters Patent hitherto, and still is the owner of, and entitled to the exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, except so far as he has granted license to persons and corporations to use and put said improvement in practice, as hereinafter stated.

And your Orator further shows unto your Honors, that he has never

granted or given to the said Defendant any right or authority to make, construct, use, or vend to others to be used, the said improvement, nor have the Defendants any right or authority so to do.

And your Orator further shows unto your Honors, that, as he is informed and believes, the said Defendants are now, and have for a long time been, using and running upon its railroad, extending from Boston in the District of Massachusetts to the boundary line between the Districts of Massachusetts and New Hampshire, about thirty-eight miles; and upon another railroad lying partly in the District of New Hampshire and partly in the District of Maine, and called the Portsmouth, Saco, and Portland Railroad, about sixty-seven miles, a large number of the said improved cars or carriages so invented by and patented to your Orator as aforesaid; that the said cars or carriages so made and used by the Defendant are and each of them is substantially the same in construction, connection, arrangement, and mode of operation, as the said improved cars or carriages in the said Letters Patent mentioned; that said cars or carriages, and each of them, is constructed, arranged, and connected upon the said improved plan, so invented by and patented to your Orator as aforesaid; and that said cars or carriages do, and each of them does, combine and put in practice the said improvement so invented by and patented to your Orator as aforesaid; that the said Defendants have used the said improved cars or carriages for a number of years last past, but how long in particular, or how many of said cars, or how frequently the Defendants have been or are using them, your Orator is not informed, and cannot state, and he prays the Defendants may discover and set forth the same fully and particularly.

And your Orator further shows unto your Honors, that, as he is informed and believes, the said Defendants have been or are making or causing to be made to use, and have been or are vending to others to be used, cars or carriages upon the said improved plan and substantially the same in construction and mode of operation as the improved cars or carriages invented by and patented to your Orator as aforesaid, and combining and embracing the improvement so invented by and patented to your Orator as aforesaid; but how long in particular the said Defendants have been so making and vending said cars or carriages, or how many said Defendants have made or caused to be made to use, or how many said Defendants have sold to others to be used, the Plaintiff is unable to state, and he prays the Defendants may discover and fully set forth as to the same.

And your Orator further shows unto your Honors, that by means of the premises the said Defendants did and still do infringe upon and violate the exclusive privileges intended to be, and which were secured unto your Orator by said Letters Patent and said renewal and extension thereof.

And your Orator further shows unto your Honors, that heretofore, to wit, in the Term of June, 1847 (on the 14th day of July, as yet of June Term, 1847), of the Circuit Court of the United States in and for the Northern District of New York, in the second Circuit, holden at Canadaigua, in said District:

- 54 Your Orator impleaded the Schenectady and Troy Railroad Company, a corporation duly incorporated under and by virtue of the laws of the State of New York, and doing business and operating a railroad from Troy to Schenectady, in said State, in an action at law, wherein your Orator declared against said last-mentioned Company, in a plea of trespass on the case, for a violation of the exclusive rights and privileges of your Orator, secured to him by the Letters Patent aforesaid, by constructing and using the said improvement, and putting the same in practice in breach of said Letters Patent, and in violation and infringement of the right, privilege, and liberty so granted and secured to the said Plaintiff by said Letters Patent, as aforesaid, to his actual damage five thousand dollars. And thereupon such proceedings were had that the said last-mentioned Company appeared in said suit, and pleaded that it was not guilty in manner and form as your Orator had declared against it.
- 55 And the Defendants in said suit filed in Court special notice of sundry matters, whereof they intended to offer proof in the defence of said suit, under the plea of the *general issue*, pursuant to the acts of Congress in such case made and provided, namely, that the alleged improvement in the construction of cars and carriages intended to run on railroads, claimed by your Orator, was known and used with the consent and approbation of your Orator before the date of his Letters Patent, or his application therefor, by the Hudson and Mohawk Railroad Company, and by the Saratoga and Schenectady Railroad Company, the former at Albany and the latter at Schenectady, in the State of New York; by the Morris Canal Company, in the State of New Jersey; by the New Castle and Frenchtown Turnpike and Railroad Company, in the States of Maryland and Delaware; by the Baltimore and Ohio Railroad Company; by the Baltimore and Washington Railroad Company (a branch of the Baltimore and Ohio Railroad Company); by the Baltimore and Susquehannah Railroad Company; by the Baltimore and York Railroad Company, in the State of Maryland; by the Wilmington Railroad Company, in the State of Delaware; and by the South Carolina Canal and Railroad Company, in the State of South Carolina.
- 57 And also, that each and every of said Companies, their officers and servants and agents, had a knowledge of said alleged improvements before the discovery or invention of the Plaintiff, and before the application of the said Plaintiff for his said patent, and used the same on their several and respective canals and railroads, to wit, the said Morris Canal Company, at Morrisville, in the State of New Jersey; the said Hudson and Mohawk Railroad Company, at Albany, and between Albany and Schenectady; the said Saratoga and Schenectady Railroad Company, between Schenectady and Saratoga Springs; the New Castle and Frenchtown Turnpike and Railroad Company, at New Castle and Frenchtown, and between those places; the Baltimore and Ohio Railroad Company; the Baltimore and Susquehannah Railroad Company, and the Baltimore and York Railroad Company, at and between the above places; the Wilmington Railroad Company, at Wilmington, and the South Carolina Canal and
- 58

Railroad Company, on their canal and railroad in that State. And also that the said companies, their officers, servants, and agents, knew and used said alleged improvements at their known and accustomed places of running their cars and doing their business. And also that the aforementioned canal and railroad companies, respectively, used said invention at the several places aforesaid, and on their canals and railroads between the termini of their several canals and railroads, before Plaintiff's discovery and application for his patent.

And also, that one Ephraim Morris, prior to the said alleged invention, invented and discovered an improvement in the construction of carriages, to wit, on the 13th day of October, 1829, in all material and substantial parts like the one claimed by said Plaintiff as his invention and discovery, and obtained, among other things, a patent therefor, bearing date the day and year last aforesaid.

And also, that sundry persons had a knowledge of and used your Orator's supposed improvement prior to his supposed discovery thereof, namely, Ephraim Morris, on the Morris Canal, in the State of New Jersey; Asa Whitney, Matthew W. Baldwin, and James B. Jones, at the city of Albany; James Stimson and John A. Smith, at Philadelphia; T. Rogers, engine builder at Paterson, New Jersey; James B. Dorsey, Isaac Knight, Robert S. Hollins, I. Candace Gatch, Reuben Aler, and Jacob Rupp, at Baltimore, while performing mechanical labor for the said Baltimore and Ohio Railroad Company on the said railroad, by Isaac F. Trimble and Richard Imlay, at Philadelphia or Baltimore, or at one or both of those places.

And also, that the alleged discovery and invention of your Orator and the material and substantial parts thereof, had been discovered by Thomas Tredgold, in a printed publication, printed and published in the city of New York, in the year 1825, by E. Bliss and E. White, and that a description thereof had been given in the Railroad Journal; also, in a book printed and published in the United States, prior to said alleged invention and discovery of said improvement, to wit, in vol. 1, for August, 1832, and for March, 1832, in vol. 2 of the same work, for November, 1833; in a work on Railroads, by Mr. Wood, printed and published in 1825; and also, in a work by Mr. Syazin, civil engineer, on Railroad Carriages, printed and published in 1828; and also the Report of the Committee of the South Carolina Central Railroad Company, published in the Railroad Journal, 2d vol., for 1833.

And also, that the description in the specification of your Orator does not contain the whole truth relative to the aforesaid invention and discovery, and that it contains more than is necessary to produce the desired effect; and that it does not contain such information and direction as to enable those acquainted with the sciences with which it is most nearly connected, to construct such improvement in cars and carriages; and also, that the said alleged improvement had been described in printed publications in England and the United States, anterior to the supposed discovery thereof by the plaintiff; and also, that the same improvement had been in public use and on sale with the consent and allowance of the said plaintiff, before his appli-

cation for a patent, and that the said plaintiff is not the first and original inventor or discoverer of the said thing patented, &c.

- 63 And also, that the alleged improvements in the construction of cars or carriages intended to run on railroads, specified and claimed by your Orator in his declaration, patent and specification, were known to the following persons in addition to those before mentioned, and to the pretended invention and discovery thereof by your Orator, and previous to his application for his said patent, viz. Thomas Robinson and Lucian M. Chase, in the State of Delaware, and John C. A. Smith, of Baltimore; and that the said improvements, or some of them, and at some one or more of the places, and on one or more of the railroads before mentioned. And also, that John B. Jervis, now or late of the city of New York, civil engineer; Asa Whitney, of the city of Philadelphia; E. P. Williams, of the city of Auburn; William C. Young, now or late of the city of Schenectady; and John Wilkinson, of the city of Syracuse, previously to the pretended invention by your Orator of the improvements described in his specification set forth in the declaration in the said suit, and before he applied for his patent in said declaration mentioned, had, and each of the before-named persons had, knowledge of the things claimed by your Orator in his specification as his improvement and invention, or of material and substantial parts thereof, at the city of Albany, the city of Schenectady and other places before mentioned, had, and each of them had, used the same, or seen the same used, on the Mohawk and Hudson Railroad; also on the Saratoga and Schenectady Railroad; also on the Utica and Schenectady Railroad, at the termination of these respective roads, and along the lines of said railroads, and also upon the several other railroads before mentioned.
- 64
- 65 And also, that James B. Dorsey, formerly of New Castle, in the State of Delaware, and now or lately in the employ of the Baltimore and Ohio Railroad, at or near Baltimore; Robert S. Hollins, Canduce Gatch, Ruben Aler, Jacob Rupp, Isaac Knight of Baltimore, in the State of Maryland, and Robert Imlay of the city of New York, previously to your Orator's alleged invention, and before his application for his said patent, had, and each of them had, knowledge of the things claimed by your Orator as his invention and improvements, or of material and substantial parts thereof, at Baltimore, in the State of Maryland, and at the other places mentioned in the former notice, and had each of them used the same, or seen the same in use, before your Orator's alleged invention thereof, and before his application for his said patent, upon the Baltimore and Ohio Railroad, the Baltimore and Washington Railroad, the New Castle and Frenchtown Railroad, and the several railroads before mentioned.
- 66 And also, that the aforesaid Ephraim Morris, previous to your Orator's supposed invention, and before his application for his said patent, had knowledge of the things claimed and patented by your Orator as his invention and improvements, or of some substantial and material parts thereof, and used the same, or saw the same in use, on the Morris Canal, in the State of New Jersey, and on the several railroads, or some of them before mentioned.

And also, that the things patented by your Orator, previously to 67
 his supposed invention or discovery thereof, and before he applied
 for his said patent in the declaration mentioned, were in public use of
 the Mohawk and Hudson Railroad, in the counties of Albany and
 Schenectady, and on the Saratoga and Schenectady Railroad, in the
 counties of Saratoga and Schenectady; that bearing carriages or
 trucks, constructed on the same principle, and embracing the sup-
 posed improvement and invention for which the said Letters Patent
 were granted to your Orator, were previously to the year 1834, and
 before your Orator applied for his said patent, in public use on the 68
 Mohawk and Hudson Railroad, under certain locomotives called the
 John Bull and the Experiment; and on the Saratoga and Sche-
 nectady Railroad, under the locomotives called the David or Davy
 Crockett; and such public use was known to the following persons
 among others, to wit, Asa Whitney, now of the city of Philadelphia;
 John B. Jervis, of the city of New York; William C. Young, now or
 late of the city of Schenectady; E. P. Williams, of the city of Auburn;
 and John Wilkinson, of the city of Syracuse.

And also, that the supposed improvement and invention claimed 69
 in said Letters Patent, granted to your Orator, were long previously
 to his supposed invention and discovery thereof, and before he applied
 for his said patent, described in the following public works, namely,
 in the Repository of Arts, Manufactures, and Agriculture, vol. 24th,
 second series, published in London, in the year 1814, pages 129 to
 139. Also, in a public work entitled, "A Practical Treatise on Rail-
 roads and Carriages," by Thomas Tredgold, published in the city of
 New York, in the year 1825, chapter fifth of said treatise. Also, in
 a public work entitled, "A Practical Treatise on Railroads and
 Interior Communications in General," by Nicholas Wood, published
 in London, in the year 1825, pages 154 to 157, and plates there
 referred to.

All which will more fully appear by reference to the record of the 70
 said suit now remaining in the said Circuit Court, or to an exem-
 plified copy thereof, in court to be produced: And issue being there-
 upon joined, the said suit was continued from Term to Term of said
 Court, to and until the Term of said Court begun and holden at
 Canadagua, in said Northern District of New York, on the 18th day
 of June, in the year 1850, at which Term the said suit was tried by
 and before the said Court, and a jury duly empanelled and sworn
 thereon; that thereupon, after the respective parties had produced
 and given evidence in said suit, and been heard by their respective
 Counsel therein, the said cause was committed to said jury by said 71
 Court, who returned their verdict in said cause to said Court, whereby
 they found that said last-mentioned Company was guilty in manner
 and form as your Orator had declared against it, as aforesaid, and
 assessed the damages of your Orator at one hundred dollars.

That, as your Orator is informed and believes, afterwards and at
 the June Term of said Court, 1851, the said last-mentioned Company
 applied to said Court for a new trial in said cause upon a case duly
 made and settled therein, and that such proceedings were had; that

72 the said Court, after hearing counsel for the respective parties upon such application, and maturely considering the same and deliberating thereon, did afterwards and on the third day of September, 1851, deny said application for a new trial in said cause, and render judgment on said verdict in favor of your Orator for his aforesaid damages and costs to be taxed, which judgment was duly entered in said Court on the 13th day of October, one thousand eight hundred and fifty-one. And which said judgment now remains of record in said Court in full force and effect unreversed.

And your Orator further shows unto your Honors, that your Orator, 73
by his attorney, requested the said Defendants herein to desist from
further using the said improvement and said improved cars or car-
riages, and from putting in practice, constructing, using, or vending to
others to be used, the said improvement, and said improved cars or
carriages constructed and put in practice upon the said improved plan
so invented by and patented to your Orator as aforesaid, and to ac-
count with and pay to your Orator the profits accruing to said De-
fendants, and the loss sustained by your Orator by reason of the
unlawful constructing, using, and vending to others to be used, the
said improvement and said improved cars or carriages as aforesaid, but 74
that the Defendants have entirely neglected and refused so to do; that,
since the trial and judgment in said suit at law as aforesaid, your
Orator, by his attorney, has applied to the said Defendants, and re-
quested the said Defendants to either desist from making or causing
to be made, and from using, or putting in practice, the said improve-
ment and said improved cars or carriages upon the said roads of said
Defendants,

or else to pay to your Orator a reasonable compensation therefor; but 75
that the Defendants have neglected and refused so to do, and are now
making, or causing to be made, said improved cars or carriages, and
putting in practice said improvement, and is daily running and using
upon said railroad, extending from Boston to the dividing line between
the Districts of Massachusetts and New Hampshire, and upon the
said Portsmouth, Saco, and Portland Railroad, a distance of about
one hundred and five miles, a large number of said improved cars or
carriages, constructed and put in practice upon the same principle,
and substantially in the same mode and manner, as the improved cars
or carriages invented by and patented to your Orator as aforesaid, in
fraud of the rights secured to your Orator by said Letters Patent and
the renewal and extension thereof as aforesaid, and to the great
damage of your Orator.

And your Orator had well hoped, that the said Defendants would 76
have complied with such your Orator's reasonable request so made as
aforesaid, but now so it is: May it please your Honors, that as your
Orator is informed by his said agent, and believes, the said Defend-
ants combining and co-operating with divers other persons and corpo-
rations to your Orator unknown, but whom and which when discov-
ered, your Orator prays may be made parties hereto, with proper and
apt words to charge them as Defendants herein, to injure and oppress
your Orator, neglect and refuse so to do, and give out and pretend
that the said Defendants will continue to use and put in practice the
said improvement and said improved cars or carriages, in defiance and
violation of the rights and privileges of your Orator, so granted and
secured to him as aforesaid.

In consideration whereof, and for as much as your Orator can only 77
have adequate relief in the premises in a Court of Equity, where

- matters of this nature are properly cognizable and relievable: To the end, therefore, that the said Defendants may, if they can, show why your Orator should not have the relief hereby prayed, and may upon oath, and according to the best and utmost of their knowledge, remembrance, information, and belief, full, true, direct, and perfect answers make to all and singular the matters aforesaid, and that as fully and particularly as if the same were here repeated, and the said
- 78 Defendants were specially interrogated thereto, and more particularly that the said Defendants may, in manner aforesaid, answer and set forth: 1st, whether the said Letters Patent were granted and issued as above stated; 2d, whether the said Letters Patent were renewed and extended as above stated; 3d, whether the said action at law was commenced and prosecuted, and the said verdict and judgment recovered and rendered as above stated; and whether the Defendants in said action did not file in Court by way of defence, to the same, the special matters before stated.
- 79 4th, whether the Defendants did not have notice and knowledge of the pendency and decision of said suit as aforesaid; 5th, whether the said Defendants have not, during a number of years last past, made, used, or sold cars or carriages constructed in the said improved mode secured to your Orator by said Letters Patent, upon the line of Defendants' railroad, and upon the said Portsmouth, Saco, and Portland Railroad,
- 80 and where, and during what time on each road, and how many of such cars or carriages at each place, on each road, and how often; 6th, what number of such cars or carriages the Defendants are now using on such road; 7th, whether the defendants are now using such improved cars or carriages on said roads, and how many on each; 8th, whether the Defendants have made or caused to be made any such cars or carriages, and how many, and within what time; 9th, whether the Defendants have sold to others to be used any of said improved cars or carriages, and how many, and when, and at what prices; 10th, whether the Defendants have not been applied to one or more times,
- 81 to desist from using the said improved cars or carriages or to pay to your Orator a reasonable compensation therefor, and whether the Defendants have not declined to comply with such request, and when was such first application made; 11th, what profits the Defendants have and are daily deriving from making, and also from using and putting in practice upon said roads, the said improvement and said improved cars or carriages; 12th, whether in February, 1845, or some other and what time, Benjamin T. Reed, the then Treasurer of the said railroad company, did not receive notice from your Orator or his

attorney to desist from infringing on his patent, and so make compensation for previous infringement.

And that the Defendants may be decreed to answer the premises, 82
and that the Defendants may be decreed to account for and pay to
your Orator all such gains and profits as have accrued to the Defend-
ants, and such loss as has been sustained by your Orator from mak-
ing, using, or vending to others to be used, the said improved cars or
carriages, and that the Defendants may be restrained by an injunction
issuing out of and under the Seal of this Honorable Court, and
directed to the Defendants, their officers and agents, from using or
putting in practice the said improvement or said improved cars or car-
riages, and from running or using the same upon said railroads, or
either of them, and from making or causing to be made, or vending to 83
others to be used, the said improved cars or carriages, or cars or car-
riages substantially the same in construction and mode of operation
as the said improved cars or carriages invented by and patented to
your Orator as aforesaid, and for such other and further relief, or for
such other or further relief as to your Honors shall seem meet and
agreeable to Equity. And that the Defendants be decreed to pay to
your Orator his costs of this suit. May it please your Honors to
grant unto your Orator, not only a writ of injunction conformable to
the prayer of this bill, but also a writ of subpœna, directed to said
EASTERN RAILROAD COMPANY, and commanding them to appear and 84
answer unto this Bill of Complaint, and also to do and receive what
to your Honors shall seem meet. And your Orator will ever pray.

C. P. & C. P. CURTIS, JR.,
Solicitors and of Counsel.

ROSS WINANS.

The above-named Eastern Railroad Company required to answer
each and all of the above interrogatories.

ROSS WINANS.

UNITED STATES OF AMERICA, }
DISTRICT OF MARYLAND, ss. }

On the fifteenth day of May, one thousand eight hundred and fifty- 85
two, before me came Ross Winans, complainant in the foregoing Bill
of Complaint, and who having signed the same, and being by me
first duly sworn, did on oath depose and say that he had read the said
bill and knew the contents thereof; that the same was true of his own

knowledge, except as to the matters which are therein stated on information and belief; and that as to those matters he believed it to be true.

ROSS WINANS.

Subscribed and sworn before me, the fifteenth day of May, one thousand eight hundred and fifty-two.

JNO. CARRERE,

*Commissioner Circuit Court of the United States
for the Fourth Circuit in and for the Mary-
land District.*

86 UNITED STATES CIRCUIT COURT, }
DISTRICT OF MASSACHUSETTS. }

ROSS WINANS, vs. THE EASTERN RAILROAD COMPANY.

IN EQUITY.

DISTRICT OF MARYLAND, ss. — ROSS Winans, the Plaintiff in the above-entitled complaint, being sworn, says that he now believes that he was, and is now, the first, true and original inventor of the improvement patented to him, and mentioned and described in the foregoing Bill of Complaint.

ROSS WINANS.

Subscribed and sworn before me, the fifteenth day of May, 1852.

JNO. CARRERE,

*Commissioner Circuit Court of the United States
for the Fourth Circuit in and for the Mary-
land District.*

87 THE UNITED STATES OF AMERICA, }
DISTRICT OF MARYLAND, TO WIT. }

I, Thomas Spicer, Clerk of the Circuit Court of the United States for the Fourth Circuit in and for the Maryland District, do hereby certify that John Carrere, Esq., before whom the foregoing affidavit was made, was, at the time of taking the same, a Commissioner duly appointed by the said Circuit Court, pursuant to the Act of Congress, entitled "An Act for the more convenient taking of affidavits and bail in civil causes depending in the Courts of the United States;" and to all his acts as such, full faith and credit is and ought to be given as well in Courts of Justice as thereout.

In testimony whereof, I hereunto subscribe my name, and affix the seal of the said Circuit Court, this fifteenth day of May, in the year of our Lord one thousand eight hundred and fifty-two.

THO. SPICER, *Circuit Court.*

May 20, 1852, filed in the Clerk's Office and subpœna issued, returnable July Rules, to wit, July 5, 1852.

ISAAC O. BARNES, *Clerk.*

For service, and a subpœna, showing the words of the original following:

UNITED STATES OF AMERICA.

MASSACHUSETTS DISTRICT, ss.

SUBPŒNA.

To the Eastern Railroad Company, a Corporation duly incorporated under and by virtue of the laws of the State of Massachusetts, and located and doing business in said State, GREETING.

FOR CERTAIN CAUSES, offered before the Circuit Court of the United States of America, for the first Circuit, within and for the Massachusetts District, as a Court of Chancery, WE COMMAND AND STRICTLY ENJOIN YOU, laying all others matters aside, and notwithstanding any excuse, that you personally be and appear before our said Circuit Court, at the Rules, to be holden at the office of the Clerk of our said Court, in Boston, in said District, on the first Monday, being the fifth day of July next, to answer concerning those things which shall then and there be objected against you by Ross Winans, a resident in the city of Baltimore, and a citizen of the State of Maryland, and a citizen of the United States, in his Bill of Complaint, and to do further and receive that which our said Circuit Court shall consider in this behalf. And this you are in no wise to omit, under the penalty of one thousand dollars. And have you there this writ.

WITNESS, the Honorable ROGER B. TANEY, at Boston, this twentieth day of May, A. D. 1852, in the seventy-sixth year of the Independence of the United States of America.

ISAAC O. BARNES, *Clerk.*

MEMORANDUM. — The Defendant is to enter his appearance in the suit in the Clerk's Office, on or before the day at which the writ is returnable, otherwise the bill may be taken *pro confesso*.

UNITED STATES OF AMERICA,
MASSACHUSETTS DISTRICT, ss.

BOSTON AND SALEM, MAY 29, 1852.

I hereby certify, that I have notified the within-named Eastern Railroad Corporation, by giving in hand to Wm. H. Foster, Esq., who stated himself to be the Clerk of said Corporation, a true and attested copy hereof.

Service and travel	\$3
Copy	1
	<hr/>
	\$4

J. H. RILEY, *Dep. U. S. Marshal*.

SUBPŒNA. — Returnable July Rules, to wit, July 5, 1852.

CIRCUIT COURT OF THE UNITED STATES.

Ad 1852

6 Dec 1852
ANSWER

OF

THE EASTERN RAILROAD COMPANY

TO

THE AMENDED BILL OF COMPLAINT OF ROSS WINANS.

*To the Honorable the Judges of the Circuit Court of the United States 88
for the First Circuit and District of Massachusetts.*

THE Eastern Railroad Company, the Respondent to the aforesaid Bill of Complaint, reserving all right of exception to the said Bill of Complaint, for answer thereto, or to so much thereof as said Company is advised it is material to answer, saith in answer to the Complainants' —

First interrogatory. That the Respondent is informed and believes, 89 that Letters Patent of the United States were granted to said Complainant, under date of October 1st, 1834, giving to him the full and exclusive right to make, use, and vend to others to be used, the improvement therein described, for the term of fourteen years from the said date thereof.

2. In answer to the second interrogatory, the Respondent denies that said Letters Patent have been renewed and extended in the manner set forth in said Bill of Complaint; but, on the contrary, avers that the proceedings of the officers, clerks, or agents at the Patent Office of the United States, if any such have been made, with a view to the extension of the said Letters Patent, are wholly void, for the following among other reasons, viz. : —

First, Because the Commissioner of Patents failed to order such 90 notice of the application for the extension of said patent as was required by law.

Second, Because said Complainant failed to publish such notice of said application as was ordered by said Commissioner, and as was required by law.

Third, Because the said alleged extension was granted by some clerk or agent, or other individual who was not the Commissioner of Patents, and not having any legal authority to grant such extension.

- 91 And therefore, for these and other reasons, this Respondent denies that said patent has been legally extended, or that by virtue thereof the Complainant has any right to maintain his said Bill.

3. In answer to the third interrogatory, the Respondent saith that it hath heard and believes that a suit between the said parties has heretofore been prosecuted; but whether the Defendant in the said action filed in defence the special matters inquired of, this Respondent, having never seen the files of the Court in which said action was instituted, or copies thereof, doth not know.

- 92 4. In answer to the fourth interrogatory, this Respondent saith, that, according to the best of the knowledge, information, and belief of this Corporation, the said company did not have knowledge or notice of the pendency or decision of the aforesaid suit, except from the statements of the said Bill of Complaint.

5. In answer to the fifth interrogatory, this Respondent saith that the said Corporation hath not, during any number of years last past, made, used, or sold any cars or carriages constructed in the mode described by the Complainant in his said Letters Patent, either upon the Eastern Railroad, or upon the Portsmouth, Saco, and Portland Railroad. Such cars and carriages thus constructed, so far as this Respondent is able to understand said mode of construction by aid of said Letters Patent, being, as this Respondent is informed and advised by skilful and practical engineers and mechanics, dangerous to the lives and limbs of travellers, and nearly if not wholly useless.

- 93 To the sixth, to the seventh, to the eighth, and to the ninth interrogatories, this Respondent answers that to the best of its knowledge, information and belief, the said Corporation have not made, used, or sold any cars such as are inquired of in the said sixth, seventh, eighth and ninth interrogatories.

To the tenth interrogatory, this Respondent saith that no application to this Corporation to desist using the said Complainant's improved cars, or to pay any compensation therefor to said Winans, was ever made, according to the best of its knowledge, recollection, information, and belief.

- 94 To the twelfth interrogatory, this Respondent saith that no notice to said B. T. Reed was given, as is inquired of; so far as the knowledge of this respondent goes: on the contrary, upon information derived from inquiry of said Reed, no such notice was ever received by him.

And, further answering, this Respondent saith, that whether the said Winans took pains to introduce into general use his alleged improvement, or what publication of his specification he made, it is not informed, and has no knowledge or information, except from the said Bill. But it is informed and believes, that the running part of said car or carriage, which is claimed as the invention of the said Winans, was well known, and had been introduced into public use long before the said Winans' pretended invention thereof; and that said Winans did not take pains or make efforts to cause the said car or carriage, as described in his specification and Letters Patent to be introduced into general use, as such cars so constructed could not

have been safely and practically put in use upon railways, when the locomotives were running at the usual rates of speed.

But this Respondent admits and avers, that railroad cars, which run upon eight wheels each, having said wheels arranged in two separate trucks of four wheels each, in a manner practically far superior to that described in the Complainants' Letters Patent, and upon mechanical principles of which the mode of arrangement claimed by the Complainant (so far as the same is intelligible by examination of the Letters Patent, specifications, and drawings) is practically an imperfect and inferior embodiment, was introduced upon the Baltimore and Ohio Railroad, and many other railroads in the United States and in foreign countries, as will be hereinafter stated; and that the same were well known to the public a number of years before the date of said Letters Patent, and before said alleged invention. 95

And as to the alleged contract of said Winans with the said Boston and Lowell Railroad, this Respondent denies the allegations of the Bill relating thereto; and it is upon further inquiry informed and believes, that the said Lowell Road did make a contract with said Winans, whereby said Corporation purchased the right to use said Winans' patent; but that the same contract contained conveyances of divers other patent rights relating to railroads, some of which were deemed to be of some value; and that said contract was made, and the sum of one thousand dollars was paid thereupon, for all these patents, chiefly if not wholly in consideration of the other patents of said Wynans; and that the patent now claimed by said Winans was then, and has ever since been, esteemed by the officers and agents of the said Lowell Railroad, as of no practical value. And that no car or carriage has ever been built or used by said Boston and Lowell Railroad, constructed in the manner described in said Letters Patent of said Complainant. 96

And that it is, and long has been, the opinion of the acting agents and engineers of said Boston and Lowell Railroad, that cars or carriages constructed according to said Winans' patent would be dangerous to the lives of passengers, and to freight, and wholly unfit for any practical use. 97

And upon inquiry this Respondent is further informed and believes that it is not true that the Engineer or Superintendent of the Boston and Providence Railroad ever ordered any cars to be constructed on said Winans' plan. But that the said Lowell, Boston, and Providence, and most, if not all other railroads, have freely and uninterruptedly used the eight-wheel car with double trucks, having the wheels of the running part arranged in a manner substantially the same as is claimed by said Winans (if his claim be intelligible and definite enough to be understood without resort to experiment and conjecture), with the full knowledge of the said Winans, without objection on his part; and that such use of the eight-wheel car so organized has been as universal and uninterrupted as the use of cars or wheels on locomotives, or railroad cars. While, at the same time, this Respondent admits and avers that the entire rail car or carriage, as organized and described in said Winans' Letters Patent and 98 99

specification, has never been used upon any railroad; it being a pernicious and dangerous machine, and not capable of being practically put to use.

- 100 And further answering, this Respondent saith, that as to the doings of the New Castle and Frenchtown Railroad, it has no knowledge; but that it is informed and believes that the said company did adopt and use railway cars constructed in such manner as the Complainant pretended to claim as his invention; that a suit at law was commenced against said company by said Winans, and was tried before Chief Justice Taney, and that eleven jurymen out of the twelve who tried the case were fully satisfied that said Winans was not the first and original inventor of the things claimed in said Letters
- 101 Patent, and had no right to maintain his said action. And that the eleven said jurymen stood ready to find a verdict in favor of said company and against said Winans; but that one of the said jurymen did not agree with the other eleven, and therefore the Jury did not agree upon a verdict in favor of the Defendants, notwithstanding that the rulings of the law were made for the purposes of that trial, as favorable as possible for the Plaintiff.
- 102 But whether it was the complete failure of the said Winans to sustain his pretended claims at this trial, or whether it was compassion upon said Winans' misfortunes in having unwisely entered into an expensive lawsuit in the vain attempt to maintain an untenable claim; or whether it was for the purpose of avoiding expensive and useless litigation, that induced said company to give, and said Winans to receive, a small sum to induce him to go his way in peace, this Respondent is not absolutely certain; but it is informed and believes, that it was solely with a view of avoiding expense, and of
- 103 buying their peace, that that company was induced to make an arrangement with Winans, at a cost far less than the expense of a new trial, even though completely successful. And what use, proper or improper, the said Winans has made of his own defeat in the aforesaid controversy, and of the fact of his receiving said trifle from his successful adversary to induce other railroad companies to pay him something rather than to be involved in harassing litigation, this Respondent doth not know, but is informed and believes that said Winans, or his agents, have so represented the facts in relation to
- 104 the aforesaid trial and the sum paid to him, as to induce some other railroad companies to suppose that he had some real claim to the said invention, and therefore to yield in some measure to his said pretensions. And further answering, this Respondent saith, that whether the Complainant did, as he alleges, waste the entire fourteen years for which said original patent was granted in attempts to make it available, which attempts were wholly in vain, as the Complainant alleges in his Bill, this Respondent hath no certain knowledge; but admits that it is true that if such attempts were made, they were in vain; and
- 105 that the Complainant's time in making them was wasted; and that the Complainant did find insuperable difficulties in the way of inducing any well-conducted railroad company (who had become acquainted with the actual facts in the case) to pay him any thing whatever for his alleged improvement, or patent right therefor.

And further answering, the said Respondent saith, that it denies the truth of the Complainant's allegation, that, from the alleged origin of the Complainant's pretended invention down to the present time, the Complainant has always claimed the said invention to be his own, and that he has never acquiesced in the manufacture and use of cars and carriages having eight wheels arranged, as described in said patent by other persons, without leave or license from him.

On the contrary, this Respondent is informed and believes, that for many years, and until long after the expiration of said Letters Patent, the said Complainant well knew, that, although the entire car, as described in his specification, was never, as an organized structure, put to any practical use, yet he also knew that the running parts of railway carriages, each having eight wheels, arranged in double trucks of four wheels each, in a manner substantially the same as this Respondent now uses, and supposes is now pretended to be claimed by the Complainant as his invention, and precisely the same as long has been and still is used by many if not all other railroads, were and have been in general and universal use throughout the United States, both before and after the granting of said Letters Patent, with the full knowledge and consent of the said Winans, and without objection on his part, and without any license or privilege derived from him, or from any one claiming under him; and that for many years said Winans hath fully acquiesced in such use of said running part of said eight-wheel cars. And this Respondent saith that it is advised and believes, and therefore avers, that if the said Complainant ever had a valid claim to the improvement as set forth in his Letters Patent, by reason of being the first and original inventor thereof, he hath abandoned and surrendered the same, and dedicated it to the public by neglecting to take out Letters Patent therefor until many years after the said invention had, by his voluntary consent, gone into public use as aforesaid, and also by his conduct as aforesaid, in allowing the same to go into public use and to be placed on sale, with his knowledge and consent after the issue of said Letters Patent. 106 107 108

And further answering, the Respondent saith, that it is advised, and therefore avers, that this Complainant has no legal or equitable right to maintain his said Bill of Complaint, inasmuch as the Respondent is informed and believes, and therefore avers, — 109

1st, That the extension of said Letters Patent was not granted by any Commissioner of Patents having jurisdiction of the matter, nor by any person having the right according to law to grant the same.

2d, By reason of the insufficiency and illegality of the notice required by law to be given and printed by said Winans, of his application for such extension.

And 3d, Also, by reason of said Winans not having printed, published, and given such notices thereof as were required and ordered to be printed and published by him. 110

And 4th, By reason that said Letters Patent are void, because the description of the thing patented and the claims set forth in said Letters are vague, indefinite, and uncertain; and not sufficiently clear

and intelligible to enable a person of ordinary skill in the building of railway cars and carriages to construct the thing patented by aid of any thing contained in said Letters Patent and specification alone, without invention and experimenting of his own.

- 111 And that, for these and other reasons, the said extension of said Letters Patent is void in law and of no effect.

And this Respondent saith, that it is informed and believes, and therefore avers, that the said improvement, set forth in said Letters Patent, or some material and substantial part thereof, was known to and used with the consent and approbation of said Winans, before the date of his said Letters Patent and of his application therefor, and before the date of his alleged invention thereof, by the following among other persons, and companies, or corporations:—

- 112 1. The South Carolina Canal and Railroad Company, in South Carolina.

2. The Baltimore and York Railroad Company, in the State of Maryland.

3. The Baltimore and Washington Railroad Company, in Baltimore, and Washington, D. C.

4. The New Castle and Frenchtown Turnpike and Railroad Company, in Maryland and Delaware.

5. The Saratoga and Schenectady Railroad Company, in the State of New York.

- 113 6. The Hudson and Mohawk Railroad Company, at Albany in New York.

7. The Morris Canal Company, in New Jersey.

8. The Baltimore and Ohio Railroad Company, in Baltimore.

9. The Baltimore and Susquehannah Railroad Company.

10. The Wilmington Railroad Company, in the State of Delaware.

11. On one or more of the railways leading out of the city of Philadelphia, Pennsylvania.

12. The Killiney Kill and Dalkey Railroad Company, in Killiney Kill and Dalkey, in Ireland.

13. The Quincy Granite Railway Company, between Quincy and Milton, Massachusetts.

14. The South Carolina Railroad Company, in South Carolina.

- 114 And that each and every one of said companies, with their officers, servants, and agents, had a knowledge of said alleged improvements, before the alleged discovery or invention thereof by the Complainant, and before his applications for Letters Patent therefor; and that said corporations, their officers, servants, and agents, used the same publicly, upon their said several and respective railroads and canals, to wit: The South Carolina Canal and Railroad Company, and the South Carolina Railroad Company, on their canal and railroad in said South Carolina. The Baltimore and Susquehannah Railroad
115 Company, and the Baltimore and York Railroad Company, and the Baltimore and Ohio Railroad Company, at and between the above-named places. The said Morris Canal Company, at Morrisville, New Jersey. The said Hudson and Mohawk Railroad Company, at Albany and Schenectady, in the State of New York, and between

said cities. The said Saratoga and Schenectady Railroad Company, between Schenectady and Saratoga Springs, in the State of New York. The New Castle and Frenchtown Railroad and Turnpike Company, at New Castle and Frenchtown, and between those places. The Wilmington Railroad Company, at said Wilmington. The Killiney Kill and Dalkey Railroad, at Killiney Kill and Dalkey, in Ireland. The Quincy Granite Railway Company in Milton and Quincy, in the State of Massachusetts; and the South Carolina Railroad Company, in Charleston in South Carolina. Also, that said companies, their officers, servants, and agents, knew of and used said alleged improvements at their known and ascertained places of running their cars and locomotives, and of doing their business. Also, that the aforesaid Canal and Railroad Companies respectively used said invention, at the several places aforesaid, on their canals and railroads between the respective termini thereof, long before the alleged Complainant's alleged discovery thereof, or application for Letters Patent therefor. Also, that the said invention of the said Complainant, or some material and substantial part thereof, was, before the date of said alleged invention, known to and used by David Mathews, now residing in Philadelphia; and the same was used by him upon the Utica and Schenectady Railroad, between the termini thereof, at Utica and Schenectady in the State of New York, and was seen and known by said Mathews, as aforesaid, to have been then and there used. And was also known, as aforesaid, to Oliver Byrne, now residing at Philadelphia, and seen and known by him to have been used at and upon said Killiney Kill and Dalkey Road at said Killiney Kill and Dalkey, in Ireland. And was also known, as aforesaid, to Horatio Allen and C. E. Detmold, now residing in the city of New York; to David Beggs, now residing at Syracuse, New York; to Edward Martin, now residing at Troy, New York; and to J. D. Peitch, residing at Charleston in South Carolina; also, E. K. Dodd, Henry Pavenell, and Tresham Tupper, senior, residing at Charleston aforesaid, and by each and every one of the aforesaid persons, to have been used before the date of the Complainant's alleged invention, by the South Carolina Railroad Company, its officers and employees, upon the said South Carolina Railroad in South Carolina. Also to Gridley Bryant, now deceased, but formerly residing at Scituate, Massachusetts; also to Jotham Cummings and Noah Cummings, residing at Quincy, Massachusetts; to David R. Nash, residing at Dorchester, Massachusetts; to George Penniman, residing at Milton, Massachusetts; and by said witnesses was known, as aforesaid, to have been used on said railway between said Quincy and Milton, by themselves, by said Quincy Railway Company, its officers and employees, at said Quincy and Milton, and along the line of said railroad.

And further answering, this Respondent alleges that the said invention of the said Complainant, or some material and substantial part thereof, was invented or discovered prior to the Complainant's alleged invention thereof, and was described by the following persons:—

1. Ephraim Morris, who obtained Letters Patent of the United States therefor, dated Oct. 13, 1829.

2. Isaac Cooper, who obtained Letters Patent of the United States therefor, dated May 22, 1837, and Oct. 25, 1832.

3. Jonas P. Fairlamb, who obtained Letters Patent of the United States therefor, dated Jan. 19, 1833.

Which patents this Respondent craves leave to produce at the hearing of this cause, and to prove that the said invention claimed by said Complainant, or some material and substantial part thereof, was known to and used by said patentees, and by the aforesaid railroad companies, at Philadelphia in the State of Pennsylvania, and at New Castle in the State of Delaware, on railroads located in those places.

- 122 And further answering, the Respondent avers that the alleged improvements in the construction of cars or carriages intended to run on railroads, specified and claimed by the Complainant in his Letters Patent, or some material and substantial part thereof, was known to the following persons, and was used by them at the several places set against their respective names, previously to the said Complainant's alleged invention, and to the date of his application for Letters Patent therefor, viz.: to Asa Whitney, of Philadelphia, Pennsylvania, at said Philadelphia; to Matthew W. Baldwin and James B. Jones, of Albany, New York, of said Albany; to James Stimson and John A. Smith, of said Philadelphia, at said Philadelphia; to J. Rogers, of Patterson, New Jersey, at said Patterson; to James B. Dorsey, of New Castle county in the State of Delaware, at said New Castle; to Isaac Knight, Robert S. Hollins, Canduce Gatch, Reuben Aler, Jacob Rupp, of Baltimore, Maryland, at said Baltimore; Isaac F. Trimble and Richard Imlay, of Philadelphia, and now or late of Baltimore, at said Philadelphia and Baltimore; Thomas Robinson and Lucian M. Chase, of Delaware, at said Delaware; John C. A. Smith, of Baltimore, at said Baltimore; Horatio Allen, of Charleston, South Carolina, at said Charleston; to Edward May, Leonard Forest, John M. Eichelberger, and Thomas McMechen, residing in said Baltimore, at said Baltimore; to John Rupp, residing at Hanover, Pennsylvania; to John A. McClain, residing at Philadelphia; to Wm. E. Rutter, residing at Elmira, in the State of New York; to James B. Dorsey, residing at said Wilmington, at said Hanover, Philadelphia, Elmira, and Wilmington. Also to George Fultz, now deceased, and invented by him; and to Jacob C. Corncross, Harman Yerkes, Joseph S. Kite, 125 John Murphy, and Laban Proctor, all residing in said Philadelphia; and were used by them or by the employees on the level of the Columbia Railroad, on the Philadelphia, Germantown, and Morristown Railroads, near Philadelphia aforesaid, long before said alleged invention thereof by said Complainant.

Also, that said improvements, or some of them, or some substantial and material part thereof, were known as aforesaid to the persons aforesaid, and used by them, or known by them to have been used as aforesaid, at the places aforesaid, and also upon the several railroads hereinbefore specified.

- 126 Also that John B. Jervis, now or late of the city of New York, civil engineer; Asa Whitney, of Philadelphia; E. P. Williams, of the

city of Auburn, New York, and now or late of Munroe, in the State of Michigan; William C. Young, now or late of the city of Schenectady, New York; and John Wilkinson, Esq., of Syracuse, New York, previously to said pretended invention of said Winans, and to his application for Letters Patent therefor, had knowledge of the things claimed in said Letters Patent, as his improvements, or of material and substantial parts thereof, and had knowledge of the public use thereof at the said cities of Albany and Schenectady, and at the other towns, and on the railroads hereinbefore mentioned; and each of said persons had used the same, or seen and known the same to have been used as aforesaid, upon the Mohawk and Hudson Railroad, also on the Saratoga and Schenectady Railroad, also on the Utica and Schenectady Railroad, in the State of New York, at the termination of said respective roads, and along the lines thereof; and at the said cities and upon the several other railroads hereinbefore mentioned. 127

Also that James B. Dorsey, formerly of New Castle, in the State of Delaware, and now or lately in the employ of the Baltimore and Ohio Railroad Company, at or near Baltimore; Robert S. Hollins, Canduce Gatch, Reuben Aler, Jacob Rupp, and Isaac Knight, all of Baltimore, Maryland; and Robert Imlay, of the city of New York, previously to said alleged invention, and to the application for Letters Patent therefor, each and every of them had knowledge of the things claimed by said Winans, as his invention, or of a material and substantial part thereof; and the same were used by them or known by them to be used at Baltimore aforesaid; and also at the other places hereinbefore mentioned; and were used by them, and seen and known by them, to have been used as aforesaid upon the said Baltimore and Ohio Railroad, and Baltimore and Washington Railroad, and New Castle and Frenchtown Railroad, and upon the other railroads hereinbefore stated. 128

Also that the things patented in said Letters, previously to the Complainant's supposed invention thereof, and before he applied for Letters Patent therefor, were in public use, or some material and substantial part thereof was in public use of the Mohawk and Hudson Railroad, in the city of Albany and Schenectady, and on the Saratoga and Schenectady Railroad in said counties of Saratoga and Schenectady; and that bearing carriages or trucks constructed on the same principle, and embracing the supposed improvement for which said Letters Patent were granted to said Winans (so far as the same are intelligible by said Letters, specifications, and drawings, alleged to be referred to therein), were previously to the year 1834, and before the Complainant's alleged invention thereof, in public use on the Mohawk and Hudson Railroad, under certain locomotives called the John Bull and the Experiment; and on the Saratoga and Schenectady Railroad, under locomotives called the David or Davy Crockett, and also in the city of Philadelphia and other railroads there. And that such public use was known to the following among other persons hereinbefore named, to wit: Asa Whitney, of Philadelphia; William C. Young, of Schenectady; John B. Jervis, of New York 129 130

city; E. P. Williams, of the city of Auburn; John Wilkinson, Esq., of Syracuse; Jonas P. Fairlamb, of Philadelphia.

- 131 And further answering, the Respondent avers that the said improvement claimed by said Winans, or some substantial or material part thereof, long before said alleged discovery or invention, and long before said application for Letters Patent therefor, had been described in the following among other printed public works, viz.:—

1. The Repository of Arts, Manufactures, and Agriculture, vol. 24th, second series, published in London in England in the year 1814. (See pages 129 to 139 more particularly, including the Specifications of Wm. and E. Chapman.)

- 132 2. A Practical Treatise on Railroads and Carriages, by Thomas Tredgold, published in London, England, in 1825. (See chapter 5.)

3. A Practical Treatise on Railroads and Internal Communications in General, by Nicholas Wood. Published in London aforesaid, in 1825. (See particularly pages 154 to 157, and the plates there referred to.)

4. The American Railroad Journal, published in New York city, in the years 1832, 1833, 1834, and 1835.

5. A work on Railroads and Carriages, published in the United States in 1828, by M. Szarzin.

- 133 6. The Railroad Manual, printed and published in the United States, vol. 1st, for August and March, 1832, and vol. 2d, for November, 1833.

7. Report of a Committee of the South Carolina Central Railroad Company, published in the Railroad Manual, or Journal aforesaid, for the year 1833.

8. A Report or Communication to the President and Directors of the South Carolina Railroad Company, printed and published in Charleston, South Carolina, in the year 1831, and the plates and drawings thereto annexed.

- 134 And that said Complainant's said alleged inventions had been, long prior to his pretended invention thereof, so fully described, drawn, pictured, and set forth in each and all of said printed and public works, that persons of ordinary skill in the construction of railway cars and carriages could by aid thereof, and without invention, have made and constructed the said alleged inventions of said Complainant, and have reduced them to practical use, so far as they are capable of being reduced to practical use.

And further answering, this Respondent saith that for the reasons aforesaid, and upon the facts set forth, and which it stands ready to verify, it avers that the said Complainant has no right to maintain his said Bill of Complaint.

- 135 This Respondent expressly denies that it has infringed upon the said alleged patent of the Complainant, by using, making, or vending to others to be used, the things specified in said Letters Patent and specification, and claimed therein.

This Respondent denies the validity of said Letters Patent, and of the alleged extension thereof.

This Respondent denies that the said Winans was the first and original inventor of the things claimed by him.

This Respondent avers that the Complainant hath lost by abandon- 136
ment whatever claims he may ever have had by reason of said patent;
and also by allowing his pretended invention to go into public use
as stated herein.

This Respondent avers that said alleged invention has been de-
scribed as hereinbefore stated, in the above-described printed works.

And for these causes, this Respondent avers that the Complainant
has no right to maintain his said Bill of Complaint, and prays this
Honorable Court that all material questions of fact, arising upon this
Answer, may be tried by a jury under the direction of the Court.

And further answering, the Respondent saith that it hath fully 137
answered as to all facts which it is advised it is material to answer.

Without this, that there is any other matter, cause, or thing in the
Complainant's said Bill of Complaint contained, material or neces-
sary for this Respondent to make answer to, and not herein well and
sufficiently answered to, confessed, traversed, and avoided, or denied,
is true to the knowledge or belief of this Respondent.

All which matters and things this Respondent is ready and willing
to aver, maintain, and prove, as the Honorable Court shall direct;
and therefore this Corporation Respondent humbly prays to be hence 138
dismissed with reasonable costs and charges in this behalf most
wrongfully sustained.

WILLIAM WHITING,
Solicitor, and of Counsel for the Respondent.

EASTERN RAILROAD COMPANY,
By ALBR. THORNDIKE, President.

CIRCUIT COURT OF THE UNITED STATES }
FOR THE DISTRICT OF MASSACHUSETTS. }

ROSS WINANS vs. THE EASTERN RAILROAD COMPANY.

In addition to the notice of special matter heretofore given in this
case. Please take notice, that the Defendants will offer in evidence
and prove that the said alleged improvement of Ross Winans, or a
material and substantial part thereof, was, prior to his alleged inven-
tion thereof, described in several printed publications, to wit, in the
Baltimore Patriot, a newspaper printed and published in the city of
Baltimore, June 24, 1831; in the Baltimore American, a newspaper
printed and published in the city of Baltimore, December 18, 1830,
and July 4, 1831; and in the Baltimore Gazette, a newspaper
printed and published in the city of Baltimore, December 17, 1830,
January 19, 1831, and July 2, 1831.

WILLIAM WHITING, *Solicitor of Respondent.*

July 13, 1853. Filed in the Clerk's Office.

Attest,

H. W. FULLER.

UNITED STATES CIRCUIT COURT,
MASSACHUSETTS DISTRICT. — October Term, 1852. }

ROSS WINANS vs. THE EASTERN RAILROAD COMPANY.

IN EQUITY.

The Replication of Ross Winans, of Baltimore, Complainant, to the Amended Answer of the Eastern Railroad Company, Defendants.

THIS Repliant saving and reserving unto himself all and all manner of advantage of exception to the manifold insufficiencies of the said Answer, for replication thereunto saith that he will aver and prove his said Bill to be true, certain, and sufficient in the law to be answered unto; and that the said Answer of the said Defendant is uncertain, untrue, and insufficient to be replied unto by this Repliant; without this, that any other matter or thing whatsoever in the said Answer contained material or effectual in the law to be replied unto, confessed and avoided, traversed or denied, is true; all which matters and things this Repliant is and will be ready to aver and prove as this honorable Court shall direct, and humbly prays as in and by his said Bill he hath already prayed.

C. P. CURTIS, JR., *Solicitor for Complainant.*

February 7, 1853. Filed in the Clerk's Office.

H. W. FULLER, *Clerk.*

Boston, April 5, 1853.

PLEASE consider this as a notice to produce at the trial or hearing of the case of Ross Winans vs. Eastern Railroad, the original drawing of the car Columbus, or the drawing alleged by you to be the original drawing thereof.

Also the copy of the Railroad Journal alleged to have contained said Ross Winans' patent of October 1, 1834.

Also the original drawing (of which an alleged copy is annexed to the Complainant's interrogatories) of the car Columbus.

WILLIAM WHITING, *Solicitor of Respondent.*

Filed July 13, 1853, in the Clerk's Office.

H. W. FULLER, *Clerk.*

CIRCUIT COURT OF THE UNITED STATES, }
MASSACHUSETTS DISTRICT.

WINANS vs. EASTERN RAILROAD COMPANY.

1. Reports of the Baltimore and Ohio Railroad Company, from 1830 to 1835, inclusive; being four or five printed volumes.
2. The printed report of the trial of the case of Winans vs. Troy and Schenectady Railroad, one vol.
3. The original deposition of Canduce Gatch, or a certified copy thereof, in said Troy case.
4. The written report and vote of the Nashua and Lowell Railroad Company, dated May 28, 1838.
5. Two printed affidavits of Oliver Byrne (or copies thereof), in the case of Winans, vs. Eaton and Gilbert.
6. Contract between said Winans and the Baltimore and Ohio Railroad Company, dated 11th February, 1834.
7. The American Railroad Journal, four printed volumes.
8. Affidavit of C. Gatch used in case of Winans vs. Eaton et al. Pay rolls.

It is agreed by the counsel, in the case of Winans vs. Eastern Railroad Company, that the foregoing shall be considered as proved in this case; and either party is at liberty to refer to the same, provided the same shall be filed with the Clerk before the publication of the testimony.

The time for closing testimony may be extended to March 15, 1854, upon the same terms as the previous agreed extensions.

WM. WHITING, *Defendants' Solicitor.*

C. P. CURTIS, JR., *Complainant's Solicitor.*

January 31, 1854. Filed in the Clerk's Office.

Attest,

H. W. FULLER, *Clerk.*

UNITED STATES OF AMERICA.

THE CIRCUIT COURT OF THE UNITED STATES, WITHIN AND FOR THE MASSACHUSETTS DISTRICT.

MASSACHUSETTS DISTRICT, ss.

To Edward G. Loring, of Boston, Esquire, United States Commissioner for the District aforesaid.

Know ye, that reposing confidence in your wisdom, prudence, and fidelity, we have appointed, and by these presents do authorize and empower, you to take the answers to the interrogatories hereunto

annexed of Charles P. Curtis, Esquire, of Boston, a witness to be examined on behalf of the Complainant, and to be used in a certain cause now pending in said Court, wherein Ross Winans is Complainant in Equity, *vs.* the Eastern Railroad Company, Respondents.

And to this end, at certain days to be by you appointed for that purpose, to cause said witness, as aforesaid, to be brought before you, and said witness, while present before you, to examine carefully on oath touching the premises. And when you shall have taken the examination as aforesaid, to reduce or cause the same to be reduced to writing, and to be subscribed by said witness in your presence. And the same, so taken and subscribed, to return, together with this Commission and your doings herein enclosed, sealed and directed to the Circuit Court aforesaid, holden at Boston, as soon as the same shall have been executed.

In testimony whereof, we have caused the seal of the said Circuit Court to be hereunto affixed.

Witness, the Honorable Roger B. Taney, at Boston, this twelfth day of April, in the year of our Lord one thousand eight hundred and fifty-three.

H. W. FULLER, *Clerk.*

N. B. — You shall not, except by consent of the parties in writing, permit either party to attend at the taking of the deposition, either himself, or by any attorney or agent, nor to communicate by interrogatories or suggestions with the Deponent whilst giving his deposition in answer to the interrogatories annexed to this commission. And you shall take such deposition in a place separate and apart from all other persons, and permit no person to be present during such examination, except the Deponent and yourself, and such disinterested person (if any) as you may think fit to appoint as a clerk, to assist you in reducing the deposition to writing. And you shall put the several interrogatories and cross-interrogatories to the Deponent in their order, and take the answer of the Deponent to each, fully and clearly.

N. B. — Deposition to be taken on paper corresponding in size with this Commission.

UNITED STATES CIRCUIT COURT, }
MASSACHUSETTS DISTRICT. — October Term, 1852. }

ROSS WINANS, *vs.* THE EASTERN RAILROAD COMPANY,
IN EQUITY.

*Interrogatories to be proposed to Charles P. Curtis, of Boston, Esquire,
on behalf of the Complainant.*

1. What is your name, residence, and profession?
2. Whether or not were you employed by the Complainant at any time to assist in the establishing his rights under Letters Patent issued

to him October 1, 1834, for an eight-wheeled railroad car; and if yea, when were you so employed?

3. If you say you were so employed, please state whether or not you made any demand upon the present Defendants, or upon any one in their behalf, for compensation for the use of said invention upon their road? If yea, please state upon whom you made such demand, and whether or not the same was in writing; and if yea, please annex a copy thereof to your deposition, or state the reason why you do not do so?

4. If you say you did make such demand, please state whether or not you received any reply thereto whether verbal or written; and if verbal, by whom was it made, and what was it. If in writing, please annex the same to your deposition; or, if you decline annexing the original, annex a true copy thereof.

C. P. CURTIS, JR., *Complainant's Solicitor.*

Cross Interrogations to Charles P. Curtis, Esquire, on the part of the Defendant.

1. Are you of counsel for the Plaintiff in this case?

2. Who are the parties in interest in the patent of Ross Winans upon which this suit is brought?

3. Has any statement been made to you by Ross Winans, or by any person on behalf of whom you made any communication, notice, or demand as to who were the parties in interest in said patent; and if so, who were the parties thus interested, who employed you, from whom did you receive instructions to make such demand, &c.?

4. Are not Mr. Gould and I. A. Spencer, Esquires, New York, part owners of the said patent; and do you know of your own knowledge that Ross Winans has any substantial interest therein? If so, what is that interest?

5. Do you know of any fact which will be beneficial to the Defendants in conducting or maintaining their defence? If so, will you state the same fully in your answer?

6. Have you stated all such facts as are inquired of in the preceding questions?

W. WHITING, *Defendant's Solicitor.*

A true copy attest,

H. W. FULLER, *Clerk.*

Answers of Charles P. Curtis, Esq. to the Interrogatories to him addressed.

To the first he says, — My name is Charles P. Curtis. I reside in Boston. I am an Attorney and Counsellor at Law.

To the second he says, — On the 29th December, A. D. eighteen hundred and forty-four, I was employed by the Complainant, through an agent (or a person who announced himself to be so), to assist in vindicating his rights under all the Complainant's patents; and I received a retaining fee to that effect.

The patent for the eight-wheeled railroad car was one of the patents aforesaid.

To the third he says, — On the eleventh February, A. D. eighteen hundred and forty-five, I wrote a letter addressed to B. T. Reed, then the Treasurer of the Eastern Railroad Company, demanding compensation for infringement by said company on the rights of this Complainant, as patentee of the eight-wheeled passenger car. I do not find, and cannot annex, a copy of the said letter; but this is the substance of it.

To the fourth he says, — On the 14th February, A. D. eighteen hundred and forty-five, I received a letter in the handwriting of B. T. Reed, and signed and addressed to me by him in words following:—

Boston, February 13, 1845.

DEAR SIR, — We have built no eight-wheeled cars, but have purchased them of Messrs. Davenport and Bridges, of Cambridgeport. Are they not the persons who have infringed the patent, if any one? I will call, and look at the specification.

Yours respectfully,

B. T. REED.

I have the original letter, and am ready to produce it if required by the Court; but, as I understand that the Eastern Railway Company have denied the receipt of any such notice from me, I prefer to retain the original letter of their Treasurer in my own custody.

Answer of said Deponent, C. P. Curtis, Esq., to Cross Interrogatories to him addressed.

To the first he says, — I am one of the Counsel for the Complainant in this cause.

To the second he says, — I do not know of any other parties in interest in the patent on which this suit is brought than Ross Winans.

To the third he says, — I made the demand referred to in the direct interrogatories by instructions from James G. Wilson. No statement was made to me by Ross Winans, nor by any other person that I can now recollect, as to the parties in interest in the said patent.

To the fourth he says, — I have no knowledge that Mr. Gould and J. A. Spencer, Esq. are, or that either of them is a part owner of the said patent. I do not know, of my own knowledge, that Ross Winans has any interest in said patent.

To the fifth he says, — I deny the legal competency of the question as addressed to an attorney of the Complainant. I am not bound to supply the Defendants with facts which will be beneficial to them in conducting or maintaining their defence, unless they are facts connected with the facts stated by me in answer to the direct interrogatories. I, however, declare that I do not know of any fact that will be beneficial to the Defendants in conducting or maintaining their defence.

To the sixth he says, — This may be a competent question, but it is not a courteous one. I have stated all that is within my knowledge, that relates to the facts inquired about in the preceding question.

CHARLES P. CURTIS.

DISTRICT OF MASSACHUSETTS, ss. — This fourteenth day of April, A. D. eighteen hundred and forty-three, personally appeared before me the above-named Charles P. Curtis, the Deponent named in the Commission hereto prefixed, and being duly cautioned, examined, and sworn to speak the truth, the whole truth, and nothing but the truth, in relation to the cause for which this deposition was taken and in said Commission specified, was examined by me on the written interrogatories and cross-interrogatories to said Commission annexed; and his answers thereto written down by me in his presence, after being carefully read over by him, were by him subscribed in my presence as and for his deposition. Taken by authority of said Commission, and for the cause therein named.

EDWARD G. LORING, *Commissioner*.

UNITED STATES OF AMERICA,

DISTRICT OF MASSACHUSETTS.

ON the twentieth, twenty-first, twenty-second, twenty-third, twenty-fourth, twenty-sixth, and twenty-seventh days of September, and on the eleventh day of October, A. D. 1853, before me, a Commissioner duly appointed by the Circuit Court of the United States for the District of Massachusetts, personally appeared WILLIAM C. HIBBARD, a witness for the Complainant in a certain suit in Equity now pending in the Circuit Court of the United States for the District of Massachusetts, wherein Ross Winans is Complainant, and the Eastern Railroad Company are Respondents.

And now on the twentieth day of September, A. D. 1853, the said William C. Hibbard, having been by me first duly cautioned and affirmed to testify the whole truth, did depose and say in answer to interrogatories propounded by C. P. Curtis, Jr., Esq., Solicitor for the Complainant, as follows:—

The Deponent, stating that he has conscientious objections to taking an oath, is duly affirmed; and the Respondents here object to the examination of the Deponent, for the reason that he has not been sworn according to the usual mode, and has not given a sufficient reason for refusing to take the oath in the common form. And the Respondents propose to interrogate the Deponent, *de bene esse*, upon the subject of his scruples aforesaid, and also to cross-examine on the merits of the case, *de bene esse*.

Int. 1. What is your name, age, place of business, and occupation? How long have you been so engaged? and state particularly what duties your profession requires you to perform.

Ans. to Int. 1. My name is William C. Hibbard. I am thirty-nine years old to-day. My place of business is Boston, and my occupation is that of mechanical engineer and draftsman. I have been engaged in mechanical pursuits all my life, but in my present business some five or six years; in drawing and arranging machinery, examining inventions, and making drawings and specifications for applications for Letters Patent. In the course of my business, I have been several times examined as an expert in several of the Districts of the United States.

Int. 2. Please state what experience you have had as an expert in patent causes, and in what class of patent cases you have testified, and where.

Ans. to Int. 2. I cannot at this time state how many times I have been examined as an expert, nor have I now at hand the means to ascertain: the subjects have been quite various, and I don't know as I can arrange them in classes, except generally they have been such as involves the subject of mechanics.

Int. 3. Have you examined Letters Patent issued to Ross Winans, Oct. 1, 1834, and are you familiar with the specification and drawing thereto annexed? If yea, please describe in full the nature of the invention therein described, as you understand the same; and state what was the condition of railroad engineering and speed of trains prior to the date of the said patent, both in this country and in Europe.

Ans. to Int. 3. I have examined a certified copy of Letters Patent issued to Ross Winans, October 1, 1834, and am familiar with the specification and drawing annexed to the same. The subject-matter of the invention therein described consists in *certain* IMPROVEMENTS *in the construction of* RAILROAD CARS, by which they were adapted to run upon the road with less friction and with greater stability of motion, when running at high velocity, than by the modes before known, by which they were better adapted to the construction of such railroads as are used in this country, and to the conditions of business required upon them; or, in other words, to enable the car to run easily and steadily, and work properly in a train with other cars.

These advantages are attained in the Plaintiff's invention, by a certain manner of arranging the wheels in connection with other parts of the car. The friction which is to be avoided or reduced by this arrangement is of a twofold character. In the *first place*, it is intended to avoid or reduce the friction which is caused by the oblique action of the flanges of the wheels against the rails when the car is upon a curve in the road, from the fact, as stated in the specification, that the axles of the bearing wheels are parallel, while the radii of the curve converge, so that the axles must be necessarily diagonal thereto, and the flanges of the wheel also diagonal to the rails. In the *second place*, in cars as before constructed, resting upon four wheels, which were permanently attached or fixed to the body upon which the burden was placed, the draft being also applied to the body, both to draw it, and the cars which followed it in the train, the free action of the wheels in conforming to the guidance of the rail was restrained, and also produced additional friction. This is obviated in the Plaintiff's improvement by placing the wheels in separate bearing carriages, and supporting the body of the car upon them in a certain manner. The axles of the wheels are placed near each other in these bearing carriages, by which the radii of the curve drawn from the points of bearing of their wheels, more nearly approach to parallelism, and thus the flanges of the wheels act less obliquely on the rails.

These bearing carriages, thus constructed, are placed under the body of the car, which is made of much greater length than was formerly used, at a comparatively remote distance apart, or near the ends of the body; that is to say, at a much greater distance apart than it would be practicable to place the axles of the four-wheel car. These

bearing carriages are so connected with the body as to be able to move in all directions with the greatest freedom that is compatible with properly sustaining the load or burden. The remote points of bearing of the body give great stability to its movement in passing over obstacles and imperfections in the rails, as the rapid undulations or vibrations of the bearing carriages in passing over such obstacles are not transmitted to the body to any great extent, on account of the manner in which they are attached to the body. When the wheels are thus placed in bearing frames, having a free movement independent of the body, they avoid the second cause of friction before mentioned, as they are thus free from the restraint of the draft, which I conceive to be an important element in the arrangement, in order to enable the car to work properly in a train with other cars, and to transmit through it the power required to draw the following cars in the train, without restraining the free action of its own wheels.

The condition of railroad engineering, prior to the date of the Plaintiff's patent, was, as I learn from the books, that railroads were employed up to the year 1830, in carrying heavy burdens, mostly minerals, and were employed in mining districts: their rate of travel ranged from four to eight miles per hour; and, in a few instances in the latter part of that period, they had attained, when drawn by horses, nearly ten miles per hour. From the fact that their rate of travel was slower than the stage-coach, and other ordinary means of conveyance, they were not used to carry passengers to any extent.

The rails then used were some of them of wood, some of them of cast iron, and a few of wrought iron. The wagons were simply boxes mounted upon two axles and coupled together at their ends, and constructed in the simplest manner, without springs, which their use and slow rate of travel did not render necessary.

After the opening of the Liverpool and Manchester Railway in 1830, when locomotives were employed, which were able to draw trains of cars fifteen miles per hour and upwards, their rapid movement over the inequalities of the rails produced such an unsteadiness of motion, as required some means to neutralize its effect. As the speed at which cars travelled increased, this instability increased in a greater ratio, from the fact that the disturbances produced by the inequalities of the rail upon the car in passing over them increased as the square of the velocity of motion, so that a car, moving at forty miles per hour, would experience a hundred times the disturbance of one moving at four miles. — In the early construction of railroads in this country, previous to the Plaintiff's patent (as I learn from the personal examinations of some of them, and the description of others, which I have received from what I consider reliable sources, such as public prints, and evidence which I heard given in the trial of the cause of Ross Winans against the Troy and Schenectady Railroad Company, which was tried at Canandaigua in July, 1850, as near as I recollect, at which I was present), curves were used of a much shorter radius than were allowed in the English passenger railroads, which required the cars to be made, if made with four wheels only, with their axles much nearer to each other, in order to enable them to

traverse sharp curves without jumping from the track; but diminishing the distance between the axles to relieve this difficulty, increased the difficulty of instability in the movement of the car in the manner fully set forth in the Plaintiff's specification.

Int. 4. Please state whether or not, in your opinion, the said invention is sufficiently described in the said Letters Patent, to enable a carriage or car builder of ordinary mechanical capacity and skill to put the same in practice? If not, wherein is it deficient?

Ans. to Int. 4. I consider that the said invention is sufficiently described as inquired of, and with a clearness not usually met with in specifications.

Int. 5. How is the point of draft shown by the said Letters Patent?

Ans. to Int. 5. It is shown as applied to the body of the car. It is shown by the drawing attached to the patent, and is the only mode which is compatible with the free action of the wheels, and which is set forth as essential to the proper operation of the car. I consider the point of draft, in relation to the burden to be transported, to be the same as that employed in the old four-wheel cars. *Its new relation to the wheels* I conceive to be due to the new arrangement of them, in connection with the body.

Int. 6. Have you seen the eight-wheel passenger and freight cars used by the Defendants on their road, and are you familiar with the mode of construction and operation thereof?

Ans. to Int. 6. I have seen and examined the cars in use on the Eastern Railroad, and believe that I am familiar with their construction and mode of operation.

Int. 7. Please to state whether or not, in your opinion, the Defendants' cars are substantially similar to those described by the Plaintiff in his Letters Patent. If not, wherein do they differ?

Ans. to Int. 7. In all that relates to the invention set forth in the Plaintiff's Patent, I consider the Defendants' cars are substantially the same.

Int. 8. Please describe what differences, however slight, you did perceive in the Defendants' cars, and state wherein lies their identity with the Plaintiff's car.

Ans. to Int. 8. The car represented in the Plaintiff's drawing is a freight-car, and the cars which I examined at the depot of the Eastern Railroad were passenger-cars, and the bodies of the same were made proper to carry passengers. The manner of constructing the framing was somewhat different in form, both from that shown in the drawing attached to the patent, and that described in the specification. The Defendants' cars had a spring-draft, so called, while that shown in the drawing is merely a rigid attachment to the body. The brakes also were somewhat different. Their identity with the Plaintiff's invention consists in arranging the wheels near together in the trucks or bearing carriages, and placing the bearing carriages at a comparatively remote distance from each other, and attached so as to move freely under the body of the car, with the body made of great length to permit such arrangement, and drawing the car by the body, so that the wheels shall not be restrained by the draft. The other parts

of the arrangement, such as springs on the draft, buffers, brakes, and such construction of the body as accommodates the load, do not, as I conceive, come within the scope of the invention.

Int. 9. How far apart are the wheels of the trucks in the Defendants' cars, and whether or not are they placed sufficiently near to bring them within the Plaintiff's invention? How far apart are the trucks?

Ans. to Int. 9. The wheels of the cars which I measured particularly, were four feet apart from centre to centre, and the wheels thirty-three inches in diameter at the tread, exclusive of flange; and the trucks or bearing carriages were forty-three feet from centre to centre, the whole length of the car being about fifty-two feet. From centre to centre of trucks, I mean from one ring-bolt to the other. I do consider that the wheels are sufficiently near together in the trucks to fully embody the Plaintiff's invention. The distance which the wheels may be placed from each other in the truck may be modified to suit the curves employed in the road; that is, curves of a larger radius will permit the wheels to be placed farther apart in the trucks, and *vice versa*.

Int. 10. Please examine the model marked O. E. M. U. S. C., and state what it purports to represent, and whether in your opinion it is a faithful representation thereof.

Ans. to Int. 10. It appears to be intended to represent an eight-wheel passenger car, with the arrangement of wheels in connection with the body, which is described and claimed in the Plaintiff's patent.

Int. 11. Have you examined the specification and drawings of a locomotive engine invented by Wm. and Edward W. Chapman, of England, described in the Repertory of Arts, vol. 24, second series, published in London in 1814? If yea, please state for what purpose the same was intended, upon what kind of a railroad it was to have been run, and in what manner it was to have been propelled.

Ans. to Int. 11. I have examined the specification and drawings inquired of, and described in the 24th volume, second series, of the Repertory of Arts. The locomotive as described was intended to be used to draw coal-wagons upon such railroads as were then in use in the vicinity of Newcastle-upon-Tyne. It was constructed substantially of an engine mounted upon a frame supported by four wheels, and received its progressive motion from winding and unwinding a chain from a barrel propelled by the engine, which chain was extended along the road between the rails. The kind of rails then used in the neighborhood of Newcastle were, as I learn from the books, wooden rails strapped with iron, and cast-iron tram-rails.

Int. 12. Please state whether or not any, and how much, side-bearing is shown upon the drawing attached to the Plaintiff's Letters Patent, and whether that amount of side-bearing is sufficient in practice. Is such side-bearing shown by the model O?

Ans. to Int. 12. Upon the drawing, the bearing between the bolsters which prevents the lateral oscillation of the body is shown to be three feet long, which I consider sufficient to carry the body of the

car steadily. The amount of bearing is shown upon the detached bolsters in figure 3, and measured by the scale attached to the drawing. The model O shows a similar bearing surface, whether of the same length I cannot state, as I do not know upon what scale it is made.

Int. 13. Please state whether or not, in your opinion, the essence or principles of the Plaintiff's invention are contained in the said description or drawing of the Chapman engine; and, if not, wherein do the two differ? Where was the point of draft in Chapman's engine, and whether or not, in your opinion, is that important, and why? What was the object of using eight wheels with that engine?

Ans. to Int. 13. The principles of the Plaintiff's invention are not, in my judgment, embraced either in the drawings or description of said Chapman's invention. In the specification of said Chapman, a modification is described, by which the engine may be borne upon six or eight wheels, if its weight should be found too heavy for the strength of the rails upon which he intended to work it. A diagram is shown in the drawings which illustrate the manner in which he intended to arrange six wheels, and in the description he states how eight may be used for the same purpose. From what we can learn from this description, he intended to arrange the wheels in such a manner as would resemble two coal-wagons attached together with the engine-frame resting upon each, and attached thereto by a swivel or ring-bolt; with friction rollers placed between the bolsters to enable it to swivel freely. It is represented only as an expedient to be resorted to in case of an excessive weight of the engine. The point from which the draft was communicated from the engine to the wagons was no where alluded to in terms in the specification, or shown in the drawing. The engine was drawn by the chain winding on the barrel.

The essence or principles of the Plaintiff's invention are not, in my judgment, contained in Chapman's description. The wheels are not described as to be placed near together in bearing carriages, to diminish the friction of their flanges upon curves in the rails, but are shown in figure 8 of the drawing to be nearly equi-distant. The bearing carriages, where they are used as suggested, are not directed to be placed far apart to give increased stability to the movement of the engine, nor do I understand from the description that any condition of speed of transit rendered any provision of that kind necessary. The object of using eight wheels with that engine was to distribute its weight upon a greater number of wheels, so that the amount borne at any one point should not exceed what the rails were capable of bearing. The point at which the draft is to be applied when eight wheels are used, arranged in two bearing frames, is, in the present state of engineering, of great importance. In the Chapman engine, at that time, it would have been a matter of less importance, on account of the slow rate at which cars then moved, and the comparatively small amount of draft required to move the trains as they were then worked. But with the great weight of trains now used, and the great velocity of travel, it is rendered absolutely

essential to the safe working of the cars, that the point of draft should not be from the bearing frames; for this reason, for instance, in drawing the first car in a train, the power required may not be more than one hundred pounds, while the power required to be transmitted through it to draw the succeeding cars may be several tons, and so of every other car to the last, and yet the wheels of each car require the same freedom of action to enable them to conform to the surface of the rail, which would be utterly impracticable if the draft were applied to the bearing frames.

Int. 14. Have you examined the drawings and description of a locomotive engine described in a treatise of railroads by Nicholas Wood, London, 1825? If yea, please examine the model now shown you, marked W by the Commissioner, and state if it be a correct representation of the same, so far as the running gear is concerned? If not, wherein does it differ?

Ans. to Int. 14. I have examined the drawing and description in the treatise inquired of by Nicholas Wood on railroads. I have also examined the model marked W, and find that in the general it is a correct representation of the arrangement of the driving wheels in their bearing frames, and the gearing by which they were propelled. The details of the engine are not represented. The manner in which the bearing frames are connected with the framing upon which the engine is placed is a matter of some doubt. The manner of construction represented in the model by which the bearing frames have a lateral movement does not disagree with the construction represented in the drawing, and described in the text referring thereto; and the employment of gearing to connect the wheels, and transmit the power of the engine to them, would seem to require a simple lateral movement of the bearing frame as shown in the model, in order to enable the gearing to work properly. But in another part of the work, in speaking of the same engine, the employment of eight wheels is alluded to as the suggestion of Mr. Chapman, on pages 144 and 145. If, then, the wheels were arranged according to the suggestion of Mr. Chapman, the bearing frames must have been made to swivel upon a central pin; but in that case the action of the bearing frames would be very objectionable to the proper working of the gearing by which the wheels are connected. The manner in which the draft was transmitted from the engine to a train is correctly represented as taken from the truck. I therefore wish to say, that I consider the manner of connecting the bearing carriages with the framing a matter of doubt, as the reasons for adopting either opinion seem to be nearly balanced.

Int. 15. Please to state whether or not you find in the aforesaid treatise any description or drawing of a railroad car substantially similar in construction and operation as that claimed by the Plaintiff, and described in his Letters Patent. If not, wherein do they differ? Why was Wood's engine put on eight wheels.

Ans. to Int. 15. I do not in said treatise find any description or drawing of a railroad car or engine at all similar in its construction or mode of operation to that described in the Plaintiff's Letter Patent. There is no allusion that I have seen in the work to any railroad car having more than four wheels.

The only thing which is borne upon eight wheels described in the book is the engine before referred to, which is the only machine with which the invention of the Plaintiff could be compared in those respects to which his improvement relates. The connection of the wheels by gearing in the manner shown would of itself utterly destroy the free action of the wheels in their bearing frames, which is an essential characteristic of the Plaintiff's invention, and which would of itself have made the contrivance practically worthless, as it was stated to have been on page 145. The wheels are placed near together in the bearing frame, in that respect similar to the Plaintiff's arrangement; and the bearing frames are also placed as near together as they can be got, so as to make the wheels equi-distant, instead of being placed remotely from each other as described in the Plaintiff's patent. And the compact arrangement shown in the drawing was considered highly objectionable by the author on account of its great length, as is stated on page 145. The draft is transmitted through the bearing frame of the engine, instead of being taken from the body, as is described in the Plaintiff's patent, by which the engine was subjected to all the disadvantages of that mode of applying the draft which I have before alluded to in the course of my examination. The employment of eight wheels in the said Wylam Engine is described as a matter of necessity, because it was heavier than the rails would bear, and is alluded to throughout the entire description as an arrangement to be avoided, when practicable, on account of its great complication.

Int. 16. Have you examined the treatise on railroads and carriages, published by Thomas Tredgold in 1825, and the description and plate of a carriage with eight wheels therein contained? If yea, please examine the model now shown you, marked T, and state whether or not, in your opinion, it is an accurate representation thereof.

Ans. to Int. 16. I have examined the treatise inquired of, and have compared it with the model marked T, and, so far as regards the arrangement of the wheels in the bearing frames, and the connection of the bearing frames with the body, I consider that the model is substantially correct.

Int. 17. What is there in the text or drawing which induces you to believe that the bearing frames had no swivelling motion in Tredgold's car?

Ans. to Int. 17. The arrangement described in the text is, that the wheel frames are connected with *the body by an axis which permits a change of levels on the rails*, so that each wheel shall bear its proper proportion of the weight of the load, which requires the wheel frame to swing on a horizontal axis, such as is represented in the drawing. Other provisions are described in the text, and shown in the drawing, for assisting the carriages to move on curves in the rails; that no swivelling of the wheel frame is mentioned in that connection in the book, so far as I have discovered. The employment of the word *axis* upon which the wheel frames turn, supposes them to move only in one direction.

Int. 18. Where was the point of draft in the said car, and what is

there in the said treatise and plates which enables you to make the statement?

Ans. to Int. 18. In the diagram representing the car with eight wheels, no mode of draft is shown, nor does the diagram purport to represent any thing more than such an arrangement of the wheels as would subdivide the weight of the load equally upon each wheel; and the several diagrams shown in plate 4 are intended to illustrate the text where the author is discussing what he considers to be the best proportion for the different parts of the carriage. The subject of the draft is not mentioned in connection with the eight-wheel carriage, but is mentioned in connection with the general construction of carriages, and illustrated by a diagram on the same plate. Figure 28, in plate 4, shows either the framing of a four-wheel carriage, or the bearing frame of an eight-wheel carriage frame, and has wheels of the same size and distance apart as those represented in figure 26. The author contemplates drawing the carriages by horses only in this connection; and figure 28 shows how the draft should be applied to the carriage below the level of the axis, as is shown by the line C. B, in the figure, and, as described on page 179, is to be adopted when the wheels are too high to get that line of draft from the shoulder of the horse without the expedients shown. The wheels are represented as apparently of great diameter, and the size recommended in the text in this connection is four and a half or five feet, which would require such an expedient to bring the line of draft to the shoulder of the horse in the manner recommended. That is the only allusion to or description of the mode of applying the draft which I recollect to have seen in the book.

Int. 19. Please to state for what object the said car therein shown was intended, and what end was to be accomplished by putting it on eight wheels, as stated in said book.

Ans. to Int. 19. The object to be attained was to enable the carriage to carry six or eight tons without requiring expensive rails, by subdividing the weight, so that no more weight should rest on each wheel than it could properly carry, and to equally divide the weight upon each wheel.

Int. 20. Please state whether or not you find in the said treatise by Tredgold any drawing, description, or suggestion of a railroad car substantially similar in principle, construction, or operation as the car claimed by the Plaintiff, or calculated to accomplish the same purposes. If not, wherein do they differ?

Ans. to Int. 20. I do not find in said treatise any drawing, description, or suggestion of a railroad car or carriage similar in principle to the invention described by the Plaintiff in his specification, or calculated to accomplish the same purpose. The only carriage mentioned in Tredgold with which the invention of the Plaintiff can be properly compared is the eight-wheel carriage already alluded to, and this does not possess either one of the essential characteristics which the Plaintiff describes and claims as his invention. It has not the wheels placed near together in bearing carriages to lessen the friction upon curvatures of the road, nor is any such arrangement alluded to in the

text for that or any other purpose. It has not the bearing carriages placed at a remote distance from each other, to give stability to the motion of the carriage when moving at a high velocity, nor is any such want mentioned or provided for in any part of the book.

The bearing frames are not so attached to the body as to conform to curvatures in the road, nor is any allusion made in the text to any such arrangement to meet that want; but other means are described for remedying or avoiding that difficulty. The draft is not represented as applied to the body of the car in connection with such an arrangement of the wheels as is described by the Plaintiff, and the subject of draft in connection with eight wheels is not mentioned; the similarity between the respective arrangements being the employment of eight wheels, to subdivide the weight of the load, which I understand the Plaintiff to disclaim.

Int. 21. Please to state what "other means" are suggested in Tredgold's treatise for avoiding the difficulties created by curvatures.

Ans. to Int. 21. The means suggested for that purpose is described on page 104; i. e. making the wheels revolve loosely on fixed axes; and one mode of securing the wheels, when thus arranged, is shown in plate 4, figure 29, and is described in the text on page 179. The manner of avoiding the difficulty recommended is making the road straight, or nearly so.

Int. 22. Have you examined an eight-wheel car at the Quincy Granite Quarry, in Massachusetts; and, if yea, whether or not you have made a drawing thereof, and state whether or not the same is correct, and how you know it to be so? Please annex the same, or a true copy thereof, to your deposition.

Ans. to Int. 22. I have examined an eight-wheel car at the Quincy Railroad in Massachusetts, and have made a drawing thereof from accurate measurements made by myself, of which I believe the exhibit marked "Quincy Car E. M. U. S. C.," to be a correct copy, as originally drawn to a scale of one inch to a foot.

Int. 23. Please examine the model shown you, marked Q, by the Commissioner, and state whether or not it is an accurate representation of the said Quincy car; and, if not, wherein does it differ?

Ans. to Int. 23. I have examined the model inquired of, and it appears to be substantially correct.

Int. 24. How far apart were the two bearing cars in the car you saw at Quincy, and whether or not you saw more than one, and how many? How far apart are they shown in the said drawing and model?

Ans. to Int. 24. The inner ends of the frame of the bearing cars were one foot apart, and their centres upon which the bolsters bore were eight feet apart, which is a little different from what the drawing annexed measures by the scale. I saw the one measured, and another one apparently worn out, of which the general dimensions were the same, as I ascertained by measurement. The distance from centre to centre of bolsters, as represented in the drawing annexed, is about seven feet eight inches. The length of the framing of the bearing cars was seven feet. The drawing is represented a little shorter. The

diameter of the tread of the wheels was eighteen inches, which is a little more than the drawing measures, and the distance of the wheels apart from centre to centre was five feet. The dimensions of the model appear to be correct. The scale of the model is also that of an inch to the foot.

Int. 25. Where was the point of draft in the said cars, and whether or not is the point of draft shown upon the said drawing and model; and if yea, where is it, and by what is it represented?

Ans. to Int. 25. The point of draft was from the bearing car, from a staple or clasp at the ends, as is shown in the drawing and model.

Int. 26. Whether or not, in your opinion, does the said "Quincy Car" embody the essential features of the Plaintiff's invention; and if not, wherein do they differ? For what objects in common were both designed?

Ans. to Int. 26. The said Quincy Car, in my opinion, does not embody the essential features of the Plaintiff's invention. It has not the wheels placed near together in the bearing cars, nor the bearing cars coupled to the body at a comparatively remote distance apart, nor the draft attached to the body in that connection. It appeared to be designed to carry heavy blocks of stone, which were too heavy for the ordinary four-wheel cars used on that road. The wheels revolved loosely on fixed axles, and it was adapted to travel only at a slow rate. When used in the form in which it is represented, it could only be used alone; and the bearing cars were also constructed so as to be used separately, if required.

The only object in common to this car and the Plaintiff's invention that I now recollect is that they were both intended to run on railroads. The employment of eight wheels to subdivide the weight of the load upon each, I do not consider to be a part of the Plaintiff's invention, but to have been disclaimed by him.

Int. 27. Have you seen the specification attached to Letters Patent issued to Ephraim Morris for cars with eight wheels, dated October 13, 1839? If yea, please state whether or not you find in said specification a description of a car substantially the same as that claimed by the Plaintiff. If not, where do the two differ?

Ans. to Int. 27. I cannot now recollect whether I have seen the specification inquired of or a certified copy thereof, but have the impression that I examined one of them at the trial at Canandaigua, before mentioned. I have before me what purports to be a printed copy of the specification, and marked by the Commissioner "E. Morris, E. M. U. S. C" (see Appendix, page), and believe that it correctly describes the invention as then exhibited in Court. I do not find in the specification a description of a car substantially the same as that claimed by the Plaintiff. They are alike only in that the weight of the car is borne upon eight wheels, and the draft is applied to the body. The wheels are not placed near together, four in a bearing frame, as described by the Plaintiff; but the body of the car is provided with four points of bearing, or axles as they are called, as will be the case if the body of the car was borne upon four wheels revolving loosely upon their axes. Upon each of the four axles a

small frame is placed which contains two wheels, so that there are four bearing frames in all. These frames are made to vibrate vertically, to accommodate the inclined planes of the road, so that the weight at all times shall be equally distributed upon the wheels. There is no provision whatever for turning lateral curves upon the rails, or for reducing the friction when upon them, nor for giving stability of motion to the car when moving at high velocity; nor were any such provisions required by the purpose to which it was applied.

Int. 28. Please examine the model of the Defendants, marked "Horatio Allen," and state whether or not in your opinion it exhibits the essential features of the Plaintiff's invention. If not, please state wherein it differs therefrom.

Ans. to Int. 28. I have examined the model inquired of, and do not consider that it exhibits the essential features of the Plaintiff's invention. It appears to represent a peculiar arrangement of wheels in a locomotive engine. It is not a car or carriage, and does not require the same, but requires a different action of the wheels than is proper to a car. The wheels are arranged nearly equidistant, instead of in the manner described by the Plaintiff, which I have frequently before alluded to; and the mode of draft on the point from which the power was imparted to the train is not shown, unless the mortice at the end of the bearing frame is intended to represent that point. In such case it is also different from the Plaintiff's invention, as respects the draft.

Int. 29. Please state wherein the invention of the Plaintiff differs, and what distinguishes it from the eight-wheel cars which preceded it, and with which you have compared it in your present deposition.

Ans. to Int. 29. The only eight-wheel cars which existed, so far as I know, prior to the Plaintiff's patent, is that described in Tredgold, before alluded to, and the Quincy car. The only general distinction which I would make, in addition to what I have already given, between the Plaintiff's car and the Tredgold and Quincy cars, as well as all the other eight-wheel vehicles which have been mentioned in the course of the examination as existing before the Plaintiff's patent, is this: that, so far as I can learn, all the previous instances of the employment of eight wheels were for the purpose of subdividing the weight upon the wheels, and remedying a weakness of the rails. Whereas the purpose of the Plaintiff's invention is to diminish the friction in moving the cars, and increase their stability of motion when running at high velocities. The mechanical arrangements in each case are adapted to those several purposes.

Int. 30. Whether or not, in your opinion, is the Quincy car capable of being drawn over the curves of a railroad with a velocity of twenty miles per hour, with stability and safety to the passengers? If not, what modifications would it require to render it capable of doing so?

Ans. to Int. 30. In my opinion it is not capable of being so drawn, even alone; and its defects would be much more serious if it were required to work in a train with other cars of the same kind. To work as inquired of, would require the wheels to be fast upon their

axles, instead of revolving loosely upon them; it would require springs to be interposed between the wheels and the load; if the curves were of a small radius, it would require the wheels to be placed nearer together; if of a large radius, the present distance of the wheels apart in the bearing car might answer. The body of the car would require to be lengthened, and the bearing cars to be placed farther apart; and the draft would be required to be applied to the body, instead of to the bearing cars.

Int. 31. Please answer the same question as applied to the Chapman engine, the Tredgold car, the car of Ephraim Morris, and the Wylam or Wood engine, and the Allen engine.

Ans. to Int. 31. So far as regards the Chapman engine, I cannot answer, as I cannot learn from the books that an engine with eight wheels was ever made, but should infer from what is stated in Wood's Treatise, before mentioned, on page 131, that an engine with eight wheels was never made; that only one was tried upon the Hetton Railroad, and was abandoned, which I suppose to be the one represented in the drawing, and described in the specification. To enable the Tredgold car to meet the conditions inquired of, would require, if used upon ordinary roads, the wheels to be placed nearer together in the bearing frames; the bearing frames to be so attached to the body as to swivel laterally, and to be placed further asunder in their connection with the body; the wheels to be fixed to the axles and made to rotate with them; bearing springs to be used; and the draft to be applied to the body.

As far as regards the Ephraim Morris car, so far as I can learn from its specification, it would require the wheels to be fitted in pairs on revolving axles, and two axles placed near together, in a bearing frame; and the bearing frames thus constructed, to be attached to the body of the car by bolsters, which would permit lateral swivelling. Bearing springs would also be required. As regards the distance apart of the wheels, as compared with that employed by Morris, I cannot answer, as those dimensions are not described in the specification.

As to the Wylam engine, I can hardly conceive that any modification of its structure would permit it to comply with the conditions inquired of, without so thoroughly changing its construction as a locomotive as to destroy its identity.

As to the Allen engine, I have some doubt what the action of independent driving wheels upon separate bearing frames, as shown in the model, would be. My opinion is that that arrangement alone would be sufficient to make the machine entirely unsafe at twenty miles per hour. The points of bearing of the boiler should be placed farther apart, and the draft should be taken from the boiler instead of the bearing frame (if that was the mode which was used), in order to make the engine answer the conditions inquired of. And if to be used on roads with short curvatures, it would require the bearing and drawing wheels to be placed nearer together in each frame.

Int. 32. Whether or not, in your opinion, does a locomotive engine constructed with a four-wheel truck swivelling horizontally, placed

under the forward end, with driving wheels with rigid axles, as shown by model X, exhibit the essential properties of the Plaintiff's invention? If not, wherein is such an arrangement deficient?

Ans. to Int. 32. The employment of a truck or bearing frame under the forward end of a locomotive in the manner shown in the model X, exhibits some of the essential properties of the Plaintiff's invention, and is highly beneficial in that respect. But it does not exhibit all the advantages and useful properties of the bearing carriage that is exhibited in the Plaintiff's invention, for the reason, that, in order to enable the bearing carriage to move freely under the body, the body itself must also be free to move to any position required by the bearing frame in following the rails. And in order to permit such free movement of the body, the other end must also be supported in such a manner as to admit of a free lateral movement, which is not the case in a locomotive, where the adhesion of the driving wheels tends powerfully to control the free action of the truck, and to crowd the flanges of its wheels against the outer rail of a curve, with a force sufficient to overcome the adhesion of the wheels upon the rails, and cause the engine to swerve from its movement in a right line. This force is in addition to that required for merely guiding the bearing carriage itself upon the rail, as is the case when it is placed under a car constructed according to the Plaintiff's invention. The difference may be seen from this fact, that the truck coöperates with the driving wheels with the least friction when it is placed near them; while, if the body were also free to move laterally, as is the case in the eight-wheel car, the distance of the bearing points apart would make no difference.

Int. 33. Whether or not are the eight-wheel cars used by the Defendants similar in principle and operation to those commonly used upon the railroads in this country, so far as your experience extends?

Ans. to Int. 33. They are.

Int. 34. Whether or not is the importance of the position of the point of draft upon eight-wheel cars exhibited by any facts within your own observation? If yea, please state what such facts are, and where you have observed them.

Ans. to Int. 34. I have observed upon certain eight-wheel cars, which are sometimes used upon the Providence Railroad, which are drawn by the trucks, that the action of the draft restrains the free movement of the truck, and almost destroys the same when it is placed as the first car in the train, as I have examined and observed when riding on the road. I ride upon that road and the Dedham branch daily. I have also examined that car when it was drawn at the rear of the train, also when drawn alone, and find that there is a great difference between the action of the trucks when it has only to draw its own body, which is made much shorter, and carries a less number of passengers, than the eight-wheel cars in common use. Freedom of the movement of the truck, which is incompatible with the steadiness of the draft, may be seen when riding in a train of cars, by comparing the rapid vibrations of the truck with the steady

and gentle movement of the body of the car that precedes or follows that upon which one is riding, as the comparative movements of the two may be then examined.

Int. 35. Whether or not, in your opinion, does the placing of the wheels of the bearing trucks at the same distance apart as the width of the track, correspond with the directions in the Plaintiff's specification in that regard? If not, wherein does it differ?

Ans. to Int. 35. The placing of the wheels in the bearing carriages at the same distance apart as the width of the track, is not mentioned in the specification; nor is any particular distance mentioned other than that they should be placed very near together, as compared with the distance at which the bearing carriages are placed asunder under the body. The proportions shown in the drawing are width of track, about four feet eight inches; wheels thirty inches diameter, on axles placed three feet apart. The placing of the wheels at the same distance apart as the width of the track, would, I consider, accord with the directions in the Plaintiff's patent, provided that the curves employed in the road upon which they were to work were of sufficient radius to permit that distance, and the distance at which the trucks were placed asunder was such as to be remote in comparison therewith.

Int. 36. When, and upon what sort of railroads, would such arrangement operate most successfully, and be advisable, — and give the reasons why?

Ans. to Int. 36. Such an arrangement would be more advisable upon roads of large curvature. I do not know that that rule of construction would be particularly advisable in any case, as in curved railroads of wide guage such a distance would obviously be too great; but in roads of four feet eight inches' guage, such as are in common use in this part of the country and in England, I consider the best distance apart to be from four to four and a half feet, as that allows of a judicious construction of truck framing, and that distance places the wheels sufficiently near together to work well upon the curves ordinarily used in this part of the country. And placing the wheels that distance apart gives more steadiness of motion to the truck than if they are placed nearer together, because each imperfection or inequality of the rail causes the truck to vibrate through a smaller angle than if the distance between the wheels were less.

Int. 37. Whether or not do you consider the manner of construction of the trucks of the Defendants' eight-wheel cars as so changing the principle of their cars, as to make them substantially different from that claimed by the Plaintiff? If not, give your reasons.

Ans. to Int. 37. I do not consider the manner of constructing the trucks of the Defendants' eight-wheel cars, nor the manner of connecting them with the body, to be such as to change the principle, and make them substantially different from the mode described and claimed by the plaintiff. The wheels in the trucks of the Defendants' cars, which I measured, were four feet apart, as I have before stated; and the distance apart of the bolsters was about forty-three feet; and the draft is applied to the body, which distances of the wheels may,

I think, justly be considered as near together, as compared with that between the bolsters, which, I think, may be properly considered as far apart, and near the ends of the body, the length of which, excluding the platforms at the end, is about fifty-two feet.

Int. 38. Whether or not, in your opinion, does the substitution of pedestals for the cross springs, shown in the Plaintiff's drawing, in the bearing trucks, substantially alter the principle of the Defendants' cars from that of the Plaintiff? If so, why?

Ans. to Int. 38. It does not, in my opinion, alter the principle of the Defendants' car as regards that part of it which is the subject of the Plaintiff's patent. I do not understand that any specific mode of constructing the bearing frame is considered essential by the Plaintiff in his specification; but, on the contrary, it is stated not to be so, except that the wheels shall be placed near together in the same, and that they shall be so constructed as to move freely in all directions under the body, for the purpose of obtaining the advantages pointed out.

Int. 39. Whether or not, in your opinion, would the temporary junction of two four-wheel platform cars by a load consisting of timbers resting on a swivelling bolster on each car, drawn by the end of the forward car, exhibit the essential principles of the Plaintiff's invention? And, if not, wherein would it be deficient?

Ans. to Int. 39. Such an arrangement would not, in my opinion, exhibit the essential principles of the Plaintiff's invention. I cannot, in the first place, consider the temporary junction of two four-wheeled platform cars by a load of long timbers resting upon each, as an organized arrangement, such as would constitute an invention adapted to the purposes for which the Plaintiff's arrangement is made. The obvious reason for connecting two cars in that manner would be the better support of the great length of the timber. If the four-wheel cars employed were such as were usually employed on that road, the distance of the wheels apart would be too great to produce a good result, and the mode of draft would also be such as to cause them to act differently from the bearing carriages of the Plaintiff, for the reasons that I have already given several times during my examination.

Int. 40. Please answer the same question on the hypothesis that such arrangement was a permanent one.

Ans. to Int. 40. It would still be deficient in such case. There would be the same objection of the distance of the wheels apart in the bearing cars, and in the mode of draft that is mentioned in my preceding answer. The distance of the cars apart is not mentioned.

Int. 41. Please examine the drawing shown you, marked "Columbus," and state whether or not, in your opinion, a car constructed in accordance therewith, would exhibit the properties and accomplish the purposes designed by that claimed by the Plaintiff? If not, wherein would such car be deficient? — (See *Exhibit*,)

Ans. to Int. 41. A car constructed according to the drawing shown me would not exhibit all the properties and accomplish the purposes designed by the Plaintiff's invention. It would be deficient in its mode of draft, being arranged to draw by the truck. The body is not made sufficiently long, and the trucks are not placed suffi-

ciently far apart, to get the best results. But the arrangement of the wheels shown, excepting the draft, or if the draft were applied to the body, would, I think, be some better than a four-wheel car. There appears to be some peculiarity of arrangement of the journals or boxes for the axles, which I do not understand, and therefore cannot judge of; and it is also deficient in not having any springs to sustain the load. In comparing it with a four-wheel car just now, I left the springs out of the question.

CROSS-INTERROGATORIES.

X Int. And in answer to the following cross-interrogatories, propounded by William Whiting, Esq., Solicitor for the Respondents, the said Deponent further deposeth and saith, —

X Int. 1. To what trade or profession were you educated? When did you begin? With whom and where did you practise it, if ever?

Ans. to X Int. 1. I was educated or brought up a machinist, having commenced the business early in life, as my father followed that business. From 1837, for about nine years following, I was in the employment of Otis Tufts, Esq., steam-engine maker, of this city, in the capacity of a draftsman and foreman of the pattern-shop. Since then, I have followed the business of drawing and arranging machinery for the public, and in the examination of inventions and procuring of patents.

X Int. 2. Have you ever seen or heard any of the questions put to you by the Plaintiff's Counsel, or the substance of them?

Ans. to X Int. 2. I have never seen or heard any of the questions put to me by the Plaintiff's Counsel before the Commissioner, until now handed to the Commissioner. My opinion of the matters to which they relate had been expressed to Counsel before in desultory conversation, — that is, the greater part of them.

X Int. 3. Have you made any statement in writing, or otherwise, to any person, upon which such said questions are founded?

Ans. to X Int. 3. I have not to my knowledge, unless the deposition I have made in the case of *Ross Winans vs. Eaton, Gilbert, and Co.*, should have been seen by the Plaintiff's Counsel, and such use made of it; but of that I have no knowledge.

X Int. 4. Have you had conversations with Charles D. Gould, or Ross Winans, upon the subject of your testimony upon the eight-wheel cars?

Ans. to X Int. 4. I have had conversation with Charles D. Gould in relation to my opinion on the subject, and to giving them in deposition; but I never saw Ross Winans, to my knowledge, in my life.

X *Int.* 5. When were you first retained as an expert in the case of Winans' patent, and by whom?

Ans. to X Int. 5. I do not consider that I have ever been retained as an expert in the case of Winans' patent, as I understand the word, in a professional sense. I was first consulted in reference to the matter at Canandaigua in 1850, as near as I recollect, shortly before the trial of the case of Ross Winans against the Troy and Schenectady Railroad Company, at which I was a witness, by Charles D. Gould. My compensation in such matters is according to the time employed only.

X *Int.* 6. How much time have you in *all* devoted to the cases of Ross Winans, and the preparation thereof?

Ans. to X Int. 6. I cannot state. I have no means now of ascertaining; and I do not know as I could tell from my books, as some of the charges are for drawings and other office-business not connected with the examination of the case.

X *Int.* 7. Will you make answer as near to the truth as you can, according to your best judgment, recollection, and belief?

Ans. to X Int. 7. To the best of my recollection, including the trial at Canandaigua, which was, as near as I recollect, about a fortnight, preparing my own deposition and making copies of the same, to be sent by mail, consultation with Counsel, and other office-business, I should think would embrace nearly two months' time; but I cannot speak positively. A considerable portion of the time has been employed in merely clerical business, which was rendered necessary, as much of the business was done by mail.

X *Int.* 8. Have you conversed with Mr. Myers and Mr. Blanchard, or either of them, on the subject of the eight-wheel car, or inventions alleged to be prior to Winans' patent, or other subjects on which you have given your testimony? If yea, how often, and at whose request?

Ans. to X Int. 8. I do not recollect that I have had any extended conversation with Mr. Myers, or any conversation in which the principles embodied in the patent were discussed. I recollect having a conversation with Mr. Myers, in which he informed me about the introduction of the eight-wheel cars into this part of the country; and some conversation was had in relation to that part of the subject. I do not recollect any other conversation with him concerning the subject-matter of the patent. I was present with Mr. Thomas Blanchard at the office of Mr. George T. Curtis, some two months ago, as near as I can recollect, in which the subject-matter of the patent was the topic of conversation. The conversation was principally between Mr. Curtis and Mr. Blanchard, and lasted an hour, as near as I can recollect; and I took but little part in it. I met Mr. Blanchard on that occasion at the request of Mr. George T. Curtis. I have not seen Mr. Blanchard since, and have never conversed with him on the subject at any other time.

X *Int.* 9. Do you mean to be understood that you never had any conversation with said Myers as to the principles of the eight-wheel car?

Ans. to X Int. 9. I mean simply that I cannot recollect ever to have had any such conversation.

X Int. 10. Have you ever seen or read any affidavit of Myers relating to the subject, or have you reason to believe that Myers ever saw an affidavit or copy of an affidavit of yours? Or has Blanchard seen any affidavit of either of you?

Ans. to X Int. 10. I have read the printed copy of Myers' deposition in the case *Winans vs. Eaton* and others, I believe, since the hearing at Cooperstown, but had not read it before. I have no reason to believe or disbelieve that Myers has ever seen any affidavit or copy of affidavit of mine, as it is a subject about which I know nothing. I also have no knowledge whether Mr. Blanchard has seen the same or not, printed or otherwise. Upon further recollection, I wish to state that I believe that Mr. Gould showed me some memorandums a year and a half ago or more, or stated to me personally, I cannot now recollect which, what Mr. Myers would testify to in the case; but my impression is that the subject was the introduction of the eight-wheel cars into this part of the country. I cannot recollect more distinctly.

X Int. 11. Do you believe in the existence of a God, who will reward the good deeds and punish the evil deeds done in the body, in a future state of existence?

Ans. to X Int. 11. I decline to answer any such question as that, because I believe it to be an infraction of my rights as a citizen. I have stated that I have conscientious scruples as to the propriety of taking an oath, and have therefore availed myself of what I conceive to be my constitutional right, to affirm to the truth of my testimony according to the requisitions of the law. I have been many times examined upon affirmation, and the attempt of Counsel to make inquiry into my conscientious belief has been checked by the Court upon a former occasion in the trial of some other case. I also was present at the trial of the cause of *Elias Howe, Jr.*, against *Bradford*, for infringing the patent of a sewing machine, and then understood his Honor, the Judge, to say, that a witness was not bound to answer such a question.

[The Plaintiff's Counsel objects to the competency of this interrogatory, upon the ground that the objection to the competency of the witness should have been taken before he was affirmed, and generally.]

X Int. 12. Do you believe in the existence of a Supreme Being; and that he will reward and punish you according to your deserts?

Ans. to X Int. 12. I decline to answer this question, for the reasons given in the preceding answer.

[The Respondents' Counsel moves that the Deponent be required to answer the question.]

The Commissioner rules that it is the privilege of the Deponent to decline to answer the question, on the ground that he is not obliged to avow his religious belief, but that the Respondents must prove it by other evidence.]

X *Int.* 13. What was the length of the ordinary four-wheel car used on the Baltimore and Ohio Railroad in 1834?

Ans. to X Int. 13. I do not know.

X *Int.* 14. What was the length of body particularly recommended and mentioned in Winans' patent, as compared with the ordinary four-wheel car.

Ans. to X Int. 14. The length of body mentioned in the patent is double the ordinary length of those which run on four wheels, as it is stated in one part of the specification; but that particular length does not appear to be considered as essential, as it speaks in a different place in the specification of increasing or diminishing the length of the body.

X *Int.* 15. Cite all the passages in the language of the patent, on the subject of length of body.

Ans. to X Int. 15. The first that I see is, "The greater the distance between the axles, while the length of the body remains the same, the less is the influence of these shocks or concussions; and this has led, in many instances, to the placing them in passenger-cars, at or near their extreme ends." Second, "The body of the passenger or other car, I make of double the ordinary length of those which run on four wheels, and capable of carrying double their load." Third, "When the bolsters of the bearing carriages are placed under the extreme ends of the body, the relief from shocks and concussions, and from lateral vibrations, is greater than it is when the bolsters are placed between the middle and the end of the body; and this relief is not materially varied by increasing or diminishing the length of the body, while the extreme ends of it continue to rest on the bolsters of the bearing cars, the load supposed to be equally distributed over the entire length of the body."

X *Int.* 16. To what extent, in feet and inches, could the length of the body be diminished below that of twice the length of the four-wheel car; while the car shall still come within the description of Winans' specification and claim? Upon what passages in the patent is your answer founded?

Ans. to X Int. 16. There is no passage in the specification, that I am aware of, by which the invention is described as defined by any specific number of feet or inches in any of its proportions. Therefore I cannot answer the question more particularly.

X *Int.* 17. Is *any particular* length of body essential in order to bring it within said claim of said Winans? If yea, state what it is?

Ans. to X Int. 17. As the words "any particular" are underscored in the question, I suppose some definite length in feet and inches is inquired for. I do not consider that any particular number of feet and inches is essential of itself, except that the body shall be of such length as to permit the trucks to be placed remotely from each other in connection with it.

X *Int.* 18. Does not the specification provide that the trucks may be placed beyond the ends of the body, so that the body may hang down between the trucks?

Ans. to X Int. 18. It does. It states such as a modification of the arrangement.

X Int. 19. How remotely from each other must said trucks be placed, in order to bring the car within said Winans' claim?

Ans. to X Int. 19. The principle of an invention, as I understand it, cannot be measured by specific dimensions. To obtain the full useful effect of the Plaintiff's arrangement, they should, in my opinion, be placed as far apart as is shown in the drawing attached to the specification in the Plaintiff's patent. This distance may be varied; and shortening the distance, more or less, would, to some extent, modify the useful effect. As to how remotely they must be placed to come within Winans' claim, I can only answer generally, that they must be placed a sufficient distance apart, to develop, to some useful extent, the advantages which the Plaintiff describes as resulting from such an arrangement.

X Int. 20. Is it necessary that the body should be more than ten or twelve feet in length, in order to bring it within said Winans' specification or claim, if it conforms in all other respects to the specification?

Ans. to X Int. 20. I do not conceive that the length of the body, as before stated, is essential to the arrangement described in the Plaintiff's specification, as it is the placing of the trucks or bearing carriages, or, in other words, the points of bearing of the body remotely from each other, which is essential in connection with the other parts of the arrangement. I think that a car with a body of ten or twelve feet in length, having the other properties described in the Plaintiff's arrangement, would be within the Plaintiff's specification.

X Int. 21. Would a car of ten or twelve feet in length, such as is inquired of in your last answer, come within said Winans' specification and claim, if the trucks were placed under the body, at or near the ends thereof?

Ans. to X Int. 21. Assuming the ordinary conditions of railroads, I think it would, although I should think the proportions defective, and not calculated to obtain the best result.

X Int. 22. Would the car constructed as stated in your last answer, come within said Winans' claim, if the bearing points of the body upon the trucks were each three feet from the ends of the body respectively?

Ans. to X Int. 22. I think it would, because I do not consider that all the advantages derived from the Plaintiff's arrangement are due solely to the distance between the trucks. It would be, as I said before, a defective arrangement; but it would embody a substantial part of the Plaintiff's invention.

X Int. 23. If the body were so short that the distance between the fore wheels in one truck, and the hind wheels in the other truck, was such as to render all the eight wheels equidistant, would such a car be embraced within the Plaintiff's claim, if it conformed in all other respects to the requisitions of the patent?

Ans. to X Int. 23. Whether such an arrangement would be embraced within the Plaintiff's claim, depends upon the construction of

it. Viewing it as a mechanic, I consider the fact to be simply this: If the wheels were placed near together in the truck, and the draft were applied, as is shown in the Plaintiff's patent, the advantages derived from placing the wheels near together in avoiding friction upon curves would be realized. The advantage gained in stability of motion of the car would be but little or imperfectly realized. My own opinion is, that the advantageous action of the truck mentioned is, by itself, a substantial part of the invention, but not the whole of it.

X Int. 24. Can you not state whether a car constructed as inquired of in the last (23d) question would or would not be such a car as is embraced within the specification and claim of said patent?

Ans. to X Int. 24. It is not such a car as is described in the specification and shown in the drawings, it being defective in the respects I have already mentioned; but, with my view of the specification and claim, I consider that such a car would be embraced within the claim and specification of the patent, for the reason I have given, — that is, that it contains a substantial portion, though not the whole.

X Int. 25. What substantial portion of said Winans' alleged invention do you mean to say such car contains?

Ans. to X Int. 25. I refer to my answer to the 23d cross-interrogatory as my answer to this.

X Int. 26. Would said car, thus constructed, contain the manner of arranging and connecting the eight wheels which constitute the two bearing carriages with a railroad car, so far as to come within the specification and claim of said Winans' patent of Oct. 1, 1834?

Ans. X to Int. 26. I can only answer, as I have before, that it would not contain the whole of the manner of arranging the eight wheels, which is described in the patent; but, with my view of the case, it would contain a substantial part of the same as would come within it.

X Int. 27. What part of the manner of arranging the eight wheels described in the patent would not be contained in the said car so constructed?

Ans. to X Int. 27. The part of the manner of arranging the eight wheels which would not be contained would be the placing of the trucks remotely from each other.

X Int. 28. Does the Plaintiff's specification require the trucks to be placed more remotely from each other in any case, than they will be, if placed at or near the ends of the body?

Ans. to X Int. 28. It does not, provided that the body is made of great length, or of sufficient length to give substantially such a proportionate distance of the trucks apart as is shown in the patent.

X Int. 29. If the body of the car were so short that, the trucks being placed at the extreme ends of the body, the wheels will still be equidistant from each other, will such a car contain the manner of arranging and connecting the eight wheels, described in the specification and claim?

Ans. to X Int. 29. It would not contain the whole manner, as I have before stated. The mere lengthening or shortening the body of the car, without changing the distance apart of the trucks, does not, as I consider, change the conditions of the arrangement.

X Int. 30. Does the separation of the trucks from each other, or bringing them together, by lengthening or shortening the body of the car, all other things remaining unaltered, make such a car come within, or not come within, the description of the specification and claim?

Ans. to X Int. 30. If the separating of the trucks is produced by lengthening the body of the car, other things being as described in the patent, such an arrangement would come fully within the specification and claim, not because the body was lengthened of itself, but because by that means the trucks would be placed remotely to each other. And *vice versa*, the bringing the trucks near together by shortening the body to the distance before mentioned, that is, with the wheels equidistant, would render the arrangement defective, as I have already repeatedly stated, and would embody but a part of the invention described and claimed, in said specification; but that part I consider would be substantial, and would come within the description of the specification and claim, as I have already stated in my answer to the 23d cross-interrogatory.

X Int. 31. Do you mean to say, that a railroad company, who should, without leave or license, construct and use a car, with two swivelling trucks with the wheels about four feet apart, having four wheels each; swivelling under a car with a body so short that, while the trucks were placed under the extreme ends thereof, the eight wheels of the car should be equidistant from each other, could such arrangement of wheels, and connection thereof with the body of the car, the draft being by the body, fairly be called a violation of the claims of said patent?

Ans. to X Int. 31. With my view of the invention, I think it would, because, in my opinion, it would embrace a substantial part of the invention described and claimed in the patent.

X Int. 32. In answer to the 3d direct question, you have made some statement as to the state of railroad engineering, &c.: will you state the titles of all the books you referred to in said answer?

Ans. to X Int. 32. The titles of all the books which I have read which refer to the subject of engineering prior to the date of the Plaintiff's patent, I cannot now recall, as the information has been gathered from various sources during a period of many years. Some of the books which I have now in my mind, I will enumerate, stating the titles as correctly as I am able:—Lardner on the Steam Engine; Lardner's Railway Economy; Tredgold's Treatise on Railroads; and Wood's Treatise, already referred to; Wood's Treatise, also, third edition, greatly enlarged from the first (Stevenson's Civil Engineering in North America, I think, also refers to the subject, but am not certain); Civil Engineer's and Architect's Journal; also the series of the Practical Mechanic and Engineer's Magazine, and a continuation of that series, called the Practical Mechanic's Journal;

Strickland's Reports; with other books, as I believe, which I cannot now recall.

X Int. 33. Suppose that the car mentioned in the answer to the 31st cross-question were not drawn by the body, will you answer the same question upon that supposition?

Ans. to X Int. 33. If it were not drawn by the body, but drawn by the truck, with the other parts arranged as described in the question, I think it would not amount to an infringement, for this reason: I think the invention of the Plaintiff consists in introducing into the car three distinguishing characteristics in connection with each other, to wit, the placing of the wheels near together in the truck, the placing of the trucks far apart, and applying the draft to the body. And, in answer to the 31st cross-interrogatory, two of those distinguishing characteristics, to wit, the arrangement of wheels in the truck, and the applying of the draft to the body so as to leave the wheels free from its influence, would develop the useful effect due to such arrangement, although the trucks were also placed near together; but, in the arrangement suggested by this interrogatory, the application of the draft to the truck would so interfere with its proper operation, that the whole arrangement taken together would not develop either of the useful results contemplated in the patent.

X Int. 34. Does the description in the patent require the trucks, under any circumstances, to be placed further apart than they conveniently may be, under one body, whatever the length of the body may be? If so, state the words of the specification on which you rely.

Ans. to X Int. 34. The description in the specification does not require the trucks to be placed farther apart than they conveniently may be, provided that the body is long enough, so that they shall be comparatively remote from each other. The mere length of the body, of itself, as I have before stated, I do not consider essential; and I get that idea from the general tenor of the specification. It is stated more particularly in these words: "The closeness of the fore and hind wheels of each bearing carriage, taken in connection with the use of two bearing carriages coupled remotely from each other as can conveniently be done for the support of one body with a view to the objects and on the principles herein set forth, is considered by me as a most important feature of my invention; for by the contiguity of the fore and hind wheels of each bearing carriage, while the two bearing carriages may be at any desirable distance apart, the lateral friction, from the rubbing of the flanges against the rails, is most effectually avoided, whilst, at the same time, all the advantages attendant upon placing the axles of a four-wheel car far apart are thus obtained."

X Int. 35. What do you mean by the trucks being comparatively remote from each other?

Ans. to X Int. 35. I mean as compared with the distance of the wheels apart in each truck, and as compared with the distance of the wheels of an ordinary four-wheel car.

X Int. 36. What degree of remoteness of the two trucks from each other, as compared with the distance of the wheels in each truck

apart, is *essential* in order to make a car correspond with that described in said specification and claim? Can you state the ratio of distances, or any rule or law by which that ratio is to be ascertained, from the patent itself? — or any rule, or law, or criterion, by which a mechanic can distinguish between such proportions or ratios of distance as do, and such as do not, come within the principle of the patent?

Ans. to X Int. 36. I do not understand that any specific distance of remoteness of the two trucks from each other, as compared with the distance of the wheels in each truck apart, is described as essential. The proportions shown in the drawing are such as will embody the advantages stated to be attained by such arrangement. Nor is there any specific ratio of distances mathematically stated, nor any specific rule or law to be observed in such construction; nor can any such ratios or dimensions be given, as they may be somewhat modified, and still develop the useful results contemplated in the patent. As I before stated, principles of machines cannot be measured by mathematical dimensions, or abstract propositions. They must be determined by the common sense and judgment. If the wheels are placed comparatively near together in the truck, say four feet apart, and the trucks are placed forty-three feet apart from centre to centre, and the draft were applied to the body, such as I saw in the cars of the Defendants at East Boston, I should say that, by the exercise of my judgment, the ratios of distance and law of arrangement were such as conformed to the conditions set forth in the specification; and the criterion of judgment I conceive to be the common-sense understanding of the whole, taken together, using the language and the drawings in their obvious signification. I cannot state any more precise criterion than that.

X Int. 37. Do you consider that you have fairly and candidly answered the last part of the last interrogatory, — beginning with the words, “any rule or law”?

Ans. to X Int. 37. I certainly intended to answer it candidly, and believe that I have answered it fairly; and intended to be understood as stating, that no specific rule or law, such as I understood to be inquired of, could be laid down apart from a common-sense view of the specification itself, taken as a whole.

X Int. 38. Will you make an answer to the last question, and state whether there is any such rule, law, or criterion, as inquired of in the 31st interrogatory, which can be laid down, taking a common-sense view of the specification itself, taken as a whole? If there be any such law, rule, or criterion, please state what such law, rule, or criterion is.

Ans. to X Int. 38. I have, as I conceive, made an answer to the last question, and have stated my opinion as plainly as I can, and do not see how I can state my opinion, as regards the law, rule, or criterion of construction, more distinctly than I have done. The rule, law, or criterion, I can only repeat, is the specification and drawing taken together as a whole. The proportions and ratios of distances may be somewhat modified, and still embody the essential characteristics of the Plaintiff's invention.

X Int. 39. Have you not said in substance, that the invention of Winans, as described in his patent, requires a certain proportion of distance between the axes of the wheels and the distance of the trucks? If you have said so, is it true?

Ans. to X Int. 39. I have not said in substance, that the invention of Winans, as described in his patent, requires a certain proportion of measured distance, but such proportion of distance as would obviously come within the meaning of the words "near" and "remote," taken in connection with the ordinary conditions of railroad engineering, such as existed at the date of the patent.

X Int. 40. What were the ordinary conditions of railroad engineering such as existed at the date of the patent, and to which you refer in your last answer?

Ans. to X Int. 40. The conditions to which I referred were the width of the track, the distance of the wheels apart in the ordinary four-wheel cars then used, the radius of curves used in the roads, the length of the ordinary four-wheel cars, and weight of rail then used, and all other conditions in the working of the road where the cars were to be used which would affect the running of the cars upon the rails.

X Int. 41. May the car be constructed with the axes of each truck further apart than they were in the ordinary four-wheel cars now in use at the date of the patent, and yet so that the car may be embraced within the claim of the patent?

Ans. to X Int. 41. I think it might be, provided the curves employed in the road would permit it. The distance apart of the axes of some of the four-wheel cars described in the patent to be in use at the date of the patent was from three and a half to five feet. I think the axes might be placed farther apart than the first dimension, and still develop the advantages described in the patent due to that part of the arrangement. I also think that, if they were placed farther apart than five feet, they would develop the same advantages, and be within the claim of the patent, if the curves of the road were also of proportionally greater radius; but if used upon a railroad of ordinary construction, having four-wheel cars of that distance of axes, the car would be defective in that respect, and the defect would be increased in proportion as the distance apart was increased. The advantages arising from the other parts of the arrangement would remain the same.

X Int. 42. Do you mean to say that the question whether such car was or was not within the claim of the patent depends upon the construction of the road it is used upon?

Ans. to X Int. 42. Not precisely so. I mean to say that it depends upon the construction of the car, as adapted to the construction of the road it is to be used upon, and that its construction would be governed in some respects by the construction of the road.

X Int. 43. What do you mean by the construction of the road, which governs the construction of the car? and how can the construction of the road aid in determining what is and what is not within the claim of the patents?

Ans. to X Int. 43. That feature in the construction of the road to

which I more particularly alluded is the length of radius of the curves ; as, when the radius is but a few hundred feet, it requires the wheels to be placed very near together ; but, with curves of several thousand feet radius, the axles of the wheels may be placed farther apart in the truck. I do not understand that the construction of the road can of itself aid in determining what is and what is not within the claim of the patent, but simply that the car is to be judged of in that respect with reference to its adaptation to the construction of the road.

X Int. 44. How does the length of the radius of the curves of a railroad enable you to tell what is and what is not within the claim of the patent ?

Ans. to X Int. 44. I have already answered this question in my answer to the 43d cross-interrogatory.

X Int. 45. May the car be so constructed that the two trucks shall not be remote from each other, as compared with the distance of the axles of each truck, and yet be within the terms of the said Plaintiff's claim ?

Ans. to X Int. 45. A car constructed with the two trucks not remote from each other, as compared with the distance of the axles of each truck, if otherwise as described by the Plaintiff, might be within the terms of the Plaintiff's claim as embracing a substantial part thereof, but would not embody the whole of it, as I have before stated. That I may not be misunderstood, I wish to state that I consider the Plaintiff's improvement to embrace three essential characteristics, more or less dependent upon each other ; to wit, the arrangement of the wheels to avoid friction, the arrangement of the same to give stability of motion at high velocities, and the arrangement of the draft to enable the car to work well in a train ; and that the employment of so much of the arrangement as would develop either one of the advantageous results described would be using a substantial part of the matter claimed.

X Int. 46. Are all these three things stated in your last answer *essential*, in your opinion, in order to construct a car that shall come within the claim of the patent ? And, if not, which is and which is not so essential, that a car constructed without embracing it, will not be within the claims of the patent ?

Ans. to X Int. 46. These three things are essential, in my opinion, in order to construct a car that should come *fully* within the claims of the patent. I do not know that either one by itself could be considered essential. A part of these essentials I think may be used in connection with other features of arrangement, and partially embody the matter claimed in the Patent, as in the several cases which have already been stated in the course of the cross-examination, and the reason for such opinion there assigned.

X Int. 47. If a car be so constructed as not to be drawn by the body, may such car, notwithstanding that fact, be substantially such an one as is described and claimed in the patent ? Or is a car thus constructed *not* substantially the same as is described and claimed in the patent ?

Ans. to X Int. 47. If a car is so constructed as not to be drawn by

the body, or in some manner equivalent thereto, by which I mean in such a manner as that the draft shall not restrain the free action of the truck, such car would not be substantially such a one as is described and claimed in the patent, taken as a whole. But it may contain a substantial part of the matter described and claimed.

X Int. 48. Answer the same question on the supposition that the car has not the remote coupling of the wheels.

Ans. to X Int. 48. I should answer this question in the same manner as the last, assuming the car to be deficient in that respect, that is, that it is not substantially the same as a whole, but contains a substantial part.

X Int. 49. Answer the same question on the supposition that the car has not the close approximation of the wheels in each truck.

Ans. to X Int. 49. On the supposition that the car was defective in the respect inquired of, but retained the other characteristics, I should answer as in the last preceding, unless the distance apart of the wheels were such as to render it useless to work upon the curves in the road.

X Int. 50. Taking these elements, viz. the draft by *the body*, or, what is equivalent to it, the near approach of the wheels in each truck, the remote position of trucks as compared with the distance of the axes of the wheels in each truck, if a car be constructed so as not to embody either two of these elements, may it be, notwithstanding the omission of the two elements, substantially the same as described and claimed in the patent? If so, which of these elements may be left out?

Ans. to X Int. 50. I think it would not, as before stated.

X Int. 51. May *either one* of these elements be left out of the car, while the car shall be still substantially like that described and claimed in the patent?

Ans. to X Int. 51. It cannot, and have the car substantially like that described and claimed in the patent, taken as a whole, as I have repeatedly before stated.

X Int. 52. Do you understand the Plaintiff's patent to be for a *combination* of parts, or for improvements in the details of the car?

Ans. to X Int. 52. I do not understand it to be for either, but for a mode of arranging parts already in use.

X Int. 53. Do you understand that the mode of arrangement which you say the patent and claim are for is *independent* of the means by which that arrangement is effected?

Ans. to X Int. 53. I did not intend to be so understood.

X Int. 54. Would placing the trucks farther apart or nearer together introduce any new mechanical principle of construction or operation? If so, what is that principle, or is this alteration a change of proportions, which is attended with more or less advantage?

Ans. to X Int. 54. The placing of the trucks far apart in connection with the other parts of the arrangement, described in the patent, does, in my judgment, introduce a new principle into the construction and operation, and that principle is the new relation which is established between the velocity of movement of the car and its sta-

bility. I do not regard it as a mere alteration of proportions, viewed in relation to the state of the art, as I understand it to have existed prior to the date of the patent.

X *Int.* 55. Does placing the *trucks far apart*, by lengthening the body of the car without reference to the rest of the arrangement specified in the patent, introduce any new principles of construction or mode of operation?

Ans. to X Int. 55. If taken out of that connection, I cannot answer the question.

X *Int.* 56. Suppose you take two ordinary bearing carriages, such as are mentioned in the patent, and place a car-body upon these trucks, connecting the trucks with the body in the manner described in the patent, will the substitution of a longer or shorter body, so as to bring the trucks nearer together or spread them further apart, introduce any new mechanical principles in the construction of such car, or in its mode of operation? If so, state what that principle is.

Ans. to X Int. 56. The mere lengthening or shortening the distance between the trucks, other things being as described in the patent, would not of itself introduce a new principle in kind. That principle would be embodied to some extent even if the trucks were placed near together, but would only be properly developed by placing the trucks far apart, so as to obtain the useful effects contemplated by that portion of the arrangement.

X *Int.* 57. Does the specification give any rule or criterion by which one can tell how far apart the wheels on the axes shall be placed in each truck, by reference either to the length of the body or the distance of the trucks, or the length of the radii of the curves of the road, or in any other way? If so, state what this criterion or rule is.

Ans. to X Int. 57. The specification itself is the rule; and a car constructed according to the drawing annexed to the specification, measured by the scale thereof, will establish such relations between the several parts thereof, in relation to those particulars inquired of, as will develop the useful effects described in the specification as due to such arrangement.

The direction given in the specification is, that the axles shall be so placed in the bearing carriages that the two wheels on either side of the carriage are placed very near to each other; the spaces between their flanges need be no greater than is necessary to prevent their contact with each other; and the nearer they are placed together, the easier will they traverse a curve. This distance is not stated to bear any specific ratio to the length of the body; but, as compared with the length of the body, the one is called "near," and the other (the body) "long." No special allusion is made to the proportion between this distance and any given length of radius of curve.

X *Int.* 58. Does not the specification lay down a rule as to the proximity of the wheels in each truck in four or five different passages taken together, or in connection with each other? If yea, please state what the direction or rule is.

Ans. to X Int. 58. The direction given in the specification in seven

ral places is, that they should be placed near together; and, from the consideration of avoiding friction by the rubbing of the flanges against the rail, when taken alone, that it would appear to be best to place the axles as near to each other as possible, thus causing them to approach more nearly to the direction of the radii of the curves and the planes of the wheels to conform to the line of the rails, and goes on to state that there are other circumstances which must not be overlooked in their construction. It also states in other places, that the wheels must be placed near together; and the idea conveyed is, that the nearer they are placed together, the more perfectly they obviate the friction of the flanges before mentioned. I do not know that there is any more particular direction given, except what is conveyed by the drawing.

X Int. 59. Is there any thing different in the operation or mechanical principles of the four-wheel car and of the bearing carriages having the wheels at the same distance apart, so far as relates to the friction of the wheels upon the rails, facility of passing curves, or any other action of the wheels upon the rails or the re-action of the rails upon the wheels, so far as results from the distance of the position of the wheels from each other?

Ans. to X Int. 59. There is not.

X Int. 60. What is the essential mechanical principle upon which the body of the car is connected with the trucks in said specification?

Ans. to X Int. 60. The mechanical principle upon which the body of the car is connected with the trucks is, that the trucks shall be so connected with it as to be able to move freely to any position required in following the course of the rails.

X Int. 61. Is there any peculiarity of devices by which that principle is embodied, stated in the specification?

Ans. to X Int. 61. There is one particular arrangement of devices for that purpose, by which that principle is embodied which is described in the specification and represented in the drawing.

X Int. 62. Is the particular mode of connection of the body with the trucks pointed out in the specification essential to embody the principles of said improvement? or may any other mode of connection be used which will allow the trucks to swivel, without changing the principles of the invention?

Ans. to X Int. 62. The particular mode pointed out in the specification I do not consider essential. Any other mode which would permit the trucks to swivel and move freely under the body, as before mentioned, would be the same in principle in that respect.

X Int. 63. Is not the friction of the wheels of a truck upon the rails least when the truck wabbles least and moves most steadily on the track?

Ans. to X Int. 63. It is only true when the track is straight and even. If the track were uneven, the friction would be least if the truck were also at liberty to conform to it.

X Int. 64. When the truck conforms to the rails, is the friction of the wheels of a truck upon the rails least when the truck moves most steadily on the track?

Ans. to X Int. 64. It is least, providing the surface of the rails is true. It is not least if the surface of the rails is uneven.

X Int. 65. What were the length of the radii of the curves on English roads in 1830 or 1834? State the shortest curves there made.

Ans. to X Int. 65. I cannot state.

X Int. 66. What was the distance of the axes of the four wheels of English cars at the time inquired of?

Ans. to X Int. 66. I cannot now recollect ever to have measured the drawings, or seen it stated particularly. From my present recollection of the drawings, I should say they were from four to five feet apart in freight cars. In the cars used upon the Liverpool and Manchester Road, my impression is that they were seven or eight feet apart, but am not certain.

X Int. 67. Will you point out any passage in the patent, if you can find any, which refers to the use of cars in trains as distinguished from using them singly?

Ans. to X Int. 67. I do not recollect any passage that specially alludes to that use of them.

X Int. 68. For the purpose of ascertaining your views as to what is and what is not substantially such a car as is described and claimed in the Plaintiff's patent, you have been asked what you consider that claim to be for; and you have been asked whether you consider it to be for improvements upon specific parts of the car, or for a combination of parts; and you have stated that you consider it to be for an arrangement of parts, and not for a combination of parts. Will you state whether you consider the claim for an arrangement of parts to be an arrangement produced by proportioning the distances between the wheels or axles in each truck, and the distance of the trucks apart under one body?

Ans. to X Int. 68. My view of the claim of the patent could hardly be stated more clearly than in the words of the claim itself. I do not understand that either the employment of eight wheels or of bearing carriages, or of applying the draft to the body of the car, are of themselves described or claimed as new, but that the novelty consists in a peculiar manner of arranging and adapting their several characteristics to each other in order to adapt the car to certain conditions in the use of cars, which are clearly described. The proportioning of the distances between the wheels or axles in each truck, and the distance of the trucks apart, are a part of the arrangement, but not the whole of it. The trucks must also be so attached to the body as to move freely under it, to enable the wheels to avoid the friction mentioned; and the draft must also be applied so as not to restrain the wheels for the same purpose.

X Int. 69. Will you answer my last question definitely?

Ans. to X Int. 69. I have carefully reviewed the 68th cross-interrogatory and my answer thereto, and believe that I have definitely and clearly answered the question as I understand it, and have nothing further to add thereto in answer.

X Int. 70. Leaving out of consideration the mode described in the

patent for connecting the trucks with the body, and taking into consideration only the other part of the claim, namely, the arrangement of the wheels or running gear, do you consider the claim of the patent, so far as relates to the arrangement and connecting eight wheels which constitute the two bearing carriages of a railroad car, to be for producing such arrangement by proportioning the distances between the wheels in each truck, and the distance of the trucks from each other?

Ans. to X Int. 70. I am not certain that I understand the purport of the language of the question, as the distinctions mentioned in the several parts of the claim do not appear to me to exist; and, in answer to the question, I can only repeat, that the proportioning the distance between the wheels in each truck, and the distance of the trucks from each other, is a part of the arrangement, but not the whole of it.

X Int. 71. Is that part of the arrangement mentioned in your last answer produced by proportioning the distances between the wheels in each truck, and the distance of the trucks from each other?

Ans. to X Int. 71. It is.

X Int. 72. If a car is so constructed as to embody those proportions of distances between the axles or the wheels in each of the two trucks and the distance apart of the two trucks which you suppose to be a part of the arrangement which the patent avers, will you state whether said car embraces or embodies all that is essential and substantial in order to constitute a car such as is claimed in the patent? In other words, is any thing else besides and in addition to *those proportions of distances necessary* to make the car *substantially* such as is embraced within the specification and claims of the patent?

Ans. to X Int. 72. I think there is. I think it is also necessary that the draft should be substantially such as is shown, in order that the car shall operate as described in the patent; and also that the attachment of the trucks to the body shall be such as to allow them to move freely, as I have repeatedly before stated; and I think that, as defined by the question, it would require springs, and all these so combined by proper mechanical arrangements as to co-operate and produce the results described.

X Int. 73. Is *any thing else* necessary in order to make the car substantially such as is described and claimed in said patent? If so, state what it is.

Ans. to X Int. 73. I do not recollect of any thing else that can be considered necessary within the arrangement which the Plaintiff describes and claims.

X Int. 74. Would a car for freight, constructed in all other respects like that described in the Plaintiff's patent, but having no springs, be substantially the same as that which is claimed in the patent? In other words, may a car having springs come within the Plaintiff's claim, when, by not having springs, it would not come within the claim?

Ans. to X Int. 74. I think a car thus described, and used under the conditions mentioned in the patent, would not embrace the whole

claim without the springs, as they are practically essential to the working of a car at high speed, or some equivalent for them; but the car would be defective. I think, however, it might embody a substantial part of the invention without springs. A car having springs would obviously come within the Plaintiff's claim, but I do not think by not having springs would entirely exclude it from the claim.

X Int. 75. Is the distance of the *flanges* the material distance in arranging the wheels of a truck? or is the material distance that of the treads or points at which the wheels bear upon the rails?

Ans. to X Int. 75. It is the points upon which the wheels bear upon the rails.

X Int. 76. Does the employing of larger or smaller wheels upon the trucks of an eight-wheel car, all other things being the same, introduce any new mechanical principle or mode of operation?

Ans. to X Int. 76. It does not.

X Int. 77. Does bringing the flanges nearer or farther apart on the trucks of an eight-wheel car, by using larger or smaller wheels, introduce into said car any new mechanical principles or rules of operation?

Ans. to X Int. 77. If I understand the question, it does not. That is, simply bringing the flanges nearer together by enlarging the wheels, the centres remaining the same, it does not.

X Int. 78. Does the substitution in the trucks of eight-wheel cars, of wheels revolving on their axes, instead of revolving with their axes, of itself considered, introduce into the eight-wheel car any new mode of arranging the said wheels, or of connecting them with the body of the car?

Ans. to X Int. 78. I think it would fairly come within the arrangement, as it is practically important in the working of cars at high velocities as contemplated in the patent. I think such change would introduce into the eight-wheel car a new feature in the mode of arranging said wheels.

X Int. 79. Did you ever construct an eight-wheel car?

Ans. to X Int. 79. I never have.

X Int. 80. How closely together in each truck may the wheels of an eight-wheel railroad car be placed, so as to operate without touching? State the nearest approach that can be made.

Ans. to X Int. 80. I think a truck may be so constructed as that the wheels may not be more than half an inch from each other.

X Int. 81. Is there any limit to the size of the wheels prescribed in the patent? If so, point it out.

Ans. to X Int. 81. There is none, except so far as a size is shown in the drawing.

X Int. 82. Do you mean to be understood that the size of wheel shown in the drawing is any limit?

Ans. to X Int. 82. I do not mean to be understood that the drawing fixes any positive limit, but simply shows a size which is considered proper. I do not understand that the specification alludes to any modification in the size of wheels in general use.

X Int. 83. Will you then state again whether any thing is to be

found in the drawing or specification fixing a limit to the size of the wheel?

Ans. to X Int. 83. I do not: general experience has done that.

X Int. 84. Would a single pair of wheels upon a single axle, swivelling upon the bolster under a railroad car, so as to swivel without restraint to the curvatures and inequalities of a railroad, answer any good practical purpose, in your judgment? If not, why?

Ans. to X Int. 84. It would not; - because railroad wheels are required to be guided by the rail, and two wheels placed in that condition cannot produce that result; that is, a single pair of wheels thus used has not the capacity to be guided by the rails, because to effect that purpose requires a bearing, to some extent, in the direction of the rails, to keep the axle transverse to them; and it therefore requires two axles acting in connection, or something which shall be equivalent to the action of the second axle, in order to enable the wheels to receive guidance from the rails and keep them on the track.

X Int. 85. Could two axles be placed so near together that the wheels would not receive their guidance from the rails alone, with safety and security to passengers?

Ans. to X Int. 85. That would depend in a measure upon the width of the track, and the diameter of the wheel. If the track were of a wide guage, say eight feet, and the wheels very small, and placed as near together as they could run, such an arrangement would be unsafe, because the extent of the parallelogram bounded by the bearing points of the wheels in the direction of the track would be too small, as compared with its dimensions transversely to the rail, to insure proper guidance.

X Int. 86. Please answer the same question, taking the ordinary guage of track, after they have been in use.

Ans. to X Int. 86. I think they could not, if we also take the ordinary wheels that are used upon them.

X Int. 87. Answer the same question, supposing you take wheels smaller than those ordinarily used.

Ans. to X Int. 87. I think, leaving out the question of *utility*, wheels could be made so small, and placed so near together, as to present the same difficulty as is mentioned in my answer to the 85th cross-interrogatory.

X Int. 88. Taking the ordinary guage of the tracks of railroads, and suppose the trucks left to the sole guidance of the rails, and allowed freely to swivel under the car, what is the *least* distance apart at which it is allowable to bring the bearing points of the wheels, according to the specification of the patent?

Ans. to X Int. 88. The least distance apart which is allowable according to the specification, is that of the extreme diameter of the wheel, plus sufficient distance for clearance.

X Int. 89. What is the length of the radius of the shortest curves now justified by engineers, in building roads intended to be used for travelling with cars at high rates of speed, in this country?

Ans. to X Int. 89. I cannot state positively, as there are so many conditions which have to be taken into account in the location of a

road; nor is my practical acquaintance with the construction of rail-roads such as will enable me to fix any positive limit.

X Int. 90. What is the radius of the smallest curves now existing in any roads in the United States, used for cars running at rapid rates?

Ans. to X Int. 90. I cannot state.

X Int. 91. If you have said that the axes of the wheels in each truck should be placed nearer together or farther apart, according to the radii of the curves of the road, what is there in the specification which will direct a mechanic how to place them, without experiment on his part, so as to adapt them to curves of different radii?

Please quote the language of the specification.

Ans. to X Int. 91. I believe I have not so stated, that the distance of the wheels apart should be controlled or made according to the radii of the curves of the road absolutely, but that curves of longer radii would permit the wheels to be placed farther apart, and yet operate usefully. I do not recollect any passage in the specification which states that the distance of the wheels apart must be modified to adapt them to curves of different radii, and the four-wheel cars of a road are adapted to it.

X Int. 92. Is or is it not essential to the good operation of a passenger-car, intended to run at rapid rates, or on curvatures and inequalities in the roads, that the axles of the wheels in each truck should be kept at all times parallel, and why?

Ans. to X Int. 92. They should be kept nearly parallel, for the reason that they are required to pass curves in opposite directions, and also to run upon a straight track; and when they are parallel, they best answer those conditions.

X Int. 93. Would a construction of the truck be safe, if there were no wheel-frame, and the axes were connected by some elastic substance, which would permit the axes to vary considerably out of parallelism?

Ans. to X Int. 93. I do not think it would.

X Int. 94. How were the bolsters of common road wagons in 1834 constructed, and how did they swivel?

Ans. to X Int. 94. There were many varieties of form, having more or less length of bearing in the centre transversely to the road, and more or less vibration lengthwise of the road. They all swivelled, so far as I know, about a king-bolt in the centre.

X Int. 95. Were they not guided by shafts or by a perch?

Ans. to X Int. 95. The forward axle was guided by shafts or a perch.

X Int. 96. Were they not drawn by shafts, or perch, or pole?

Ans. to X Int. 96. They were generally so drawn, or by some device permanently attached to the axle.

X Int. 97. Provided that the bearing points of the wheels of a truck upon the rails are not so far apart as to prevent the truck from running around the curves, and not so near together as to allow the truck to turn round and lose the power of being guided by the rails, does altering the distance of the bearing points between these ex-

tremes introduce into the truck any new principles of construction, or mode of operation?

Ans. to X Int. 97. Between the construction of a truck with the wheels so far apart as that they might run round a curve, and the nearest practicable distance at which they could be placed, I think there might properly be said to be a difference in the principle of construction, considered as a part of the construction of a car, and that principle would be the different relation which the trucks in either of the supposed cases would bear to the friction which is produced by the flanges of the wheels, acting against the rails; but that difference would become less and less as we depart from these extreme limits.

X Int. 98. By the new principle spoken of as being introduced, do you mean any thing more or less than that the friction caused by the farthest separation would be greater than that caused by the nearest juxtaposition of the wheels in the trucks?

Ans. to X Int. 98. I do mean something farther than that. I mean the relation which that friction also bears to the rails, and to all the effects which result from it in the practical working of the truck.

X Int. 99. Will you explain what you mean by "the relation that the friction bears to the rails;" and what is the difference between the relation that friction bears to the rails in the one case and in the other of the supposed cases in question 97, or between the relation that friction bears to the rails in case of one of these extremes, and of a medium between them?

Ans. to X Int. 99. By that phrase, I mean that relation which may be expressed by this distinction: that, in the one case, the friction of the wheels against the rails would not be such as to produce any very prejudicial effect upon the rails or wheels; and, in the other case, the friction would be so great as to rapidly destroy both the rails and wheels, and render the movement of the truck unsafe, and liable to get off the track; and any intermediate distance of the wheels apart, between those two extremes, would partake more or less of these different relations.

X Int. 100. If at any intermediate distance, as stated in your last answer, the structure does partake more or less of these relations, how can it be said with propriety that any *new* mechanical principle is introduced at any particular point of distance of the bearing points between the two extremes?

Ans. to X Int. 100. It cannot be said that any new mechanical principle is introduced at "*any particular point* of distance," as principles of machines cannot be measured or defined by dimensions. As a parallel illustration, I would say that it would be impossible to draw a dividing line between green and yellow in the spectrum; but they are none the less distinct colors.

X Int. 101. Do you mean to be understood, by your last answer, that there is a substantial difference in mechanical construction between trucks in all other respects alike, except that the bearing points are more or less remote, within the limits aforesaid; and that there is a substantial difference between trucks in all other respects the

same, excepting that their trucks are built within the extremes of the distance, as mentioned in the 97th question, and there built with the distance of the bearing points half-way between these two extremes?

Ans. to X Int. 101. I do consider that there is a substantial difference in mechanical construction between the extremes mentioned as applied to the purposes, and under the conditions in which they are used; and that such difference would vary between those extremes, as I have before stated; and whether such difference were substantial or not, would depend upon its practical operation, in connection with the other conditions with which it is to be used. I cannot answer more definitely.

X Int. 102. Will you please to answer the last branch of the last question more definitely, assuming the practical operation, in connection with the other conditions with which it is to be used, of trucks, as inquired of in the last question, to be those of an eight-wheel car, running at rapid rates on the railroads of the United States?

Ans. to X Int. 102. I cannot answer the question more definitely than I have. I believe that I have stated my opinion as regards this part of the subject, clearly; and the question does not seem to me capable of being answered with greater particularity.

X Int. 103. Will you answer the last branch of the 101st question, upon the supposition that the said trucks are to be used upon the railroads of the United States, as ordinarily built, and under the ordinary eight-wheel railroad car?

Ans. to X Int. 103. As I understand this question in connection with the others, the nearest limit at which wheels could be placed would be so that they could just clear each other, or a little more than their diameter apart between the centres; and the longest limit, such as might be made to move around the curve, ordinarily allowed in railroads in the United States. A truck with the wheels half-way between the two extremes would, I think, in its operation in an eight-wheel car, be substantially different from one constructed with the nearest limits, not because it was so many feet or inches longer, of itself, but because it would then be too long to move freely around the ordinary curves without unnecessary friction. In comparing such a truck with the longest limit, it would develop the same difficulty, except that the longer the truck, the greater would be the difficulty; and in its relation to the ordinary working of an eight-wheel car, it would develop the same defective principle. The limit at which that difficulty would become practically important, would depend upon the curves of the road.

X Int. 104. Do you mean to be understood, in the last part of your last answer, that there would or would not be the introduction of any new mechanical principle in passing from the *medium* distance of the bearing points to the extreme distance aforesaid?

Ans. to X Int. 104. I do not mean to be understood that there is the introduction of any new mechanical principle in kind, but that the defective principle is more fully developed in the one than in the other.

X *Int.* 105. What do you mean by the words in your last answer, "new mechanical principle in kind," and by the words, the "defective principle"? Please define those phrases.

Ans. to X Int. 105. By the words "new mechanical principle in kind," I mean what the language obviously implies. I do not know that I can use other words to make it clearer. By the defective principle mentioned, I mean the friction developed to so great an extent as to become substantial in the working of the car; that is, that it becomes so important in the working of the car as to interfere with its proper useful operation.

X *Int.* 106. By "new principle in kind," do you mean "new kind of principle in mechanics"?

Ans. to X Int. 106. I do not know as I understand what "a new kind of principle in mechanics" means, and therefore cannot answer. There seems to be an ambiguity in the expression, which does not convey any definite idea to my mind. The principles of mechanics have a wide range of variety, and cannot be classed by kinds, as seems to be inquired of in the question.

X *Int.* 107. If so, will you explain what you mean by the words "in kind," in your answer to the 104th question?

Ans. to X Int. 107. I meant that no new principle, as distinguished from another, embodying relations of a different character.

X *Int.* 108. Will you explain your last answer more fully?

Ans. to X Int. 108. I meant to be understood that in each of the two cases mentioned, the friction produced by the arrangement of the wheels inquired of, was in each case, that is, with the wheels at the most remote point of arrangement inquired of, and as arranged at an intermediate point, such as to a substantial degree interfere with the proper working of the car; and therefore that each embodied the same defective principle, but developed in one to a greater extent than in the other; and therefore that the defective principle developed in the one case was the same in kind as that developed in the other. I cannot state it plainer.

X *Int.* 109. Do you understand that a truck which causes more friction on the wheels and rails than another, by reason of that friction thereby embodies a substantially different mechanical principle and mode of operation, whenever the increase of friction becomes substantial?

Ans. to X Int. 109. It does or does not, according to the relation which it bears to the other part of the arrangement; and whether it is substantial or not, is to be determined by its relation to such other parts, and I think cannot be determined by relation to itself alone. In that case, it is only a difference in degree.

X *Int.* 110. Can you, to any considerable extent, change the distance between the bearing points of the wheels in each truck upon the rails, without changing the mechanical principles and practical operation of the truck?

Ans. to X Int. 110. The distance between the bearing points of the wheels in each truck upon the rails can be changed to some extent, and the mechanical principle and operation of the truck in connection

with the car would be the same. How much they may be so altered, must depend upon the circumstances of each particular case.

X Int. 111. Taking the ordinary size of wheels used on the railroads in the United States, how near may the bearing points of the wheels be brought together without the flanges touching in practical operation?

Ans. to X Int. 111. The ordinary size of wheels in use in cars, so far as I know, is about three feet in their extreme diameter, or the outside diameter of the flanges; and the wheels could probably be made to run within half an inch of each other, which would make the bearing points three feet and half an inch apart.

X Int. 112. Taking the ordinary size of wheels, and such curves as are used upon the railroads in Massachusetts or New York, how far may the bearing points of the wheels be placed apart, while they shall run freely and have no unnecessary friction in passing the curves or other irregularities of the road?

Ans. to X Int. 112. My practical knowledge of the subject is not sufficient to enable me to fix the limit, as I have not tried or witnessed any experiments, and do not know the radii of the curves.

X Int. 113. If so, how can you say, that, in point of fact, there is any unnecessary friction introduced in the truck in its practical operation on railroads, by reason of the bearing points of the wheels upon the rails being further apart than the distance at which they could safely be placed nearest together?

Ans. to X Int. 113. I can say so from my general knowledge of mechanical principles, and also from having seen cars, in which I have been riding, experience the difficulty of injurious friction when upon very sharp curves.

X Int. 114. At what distance apart were the axes or bearing points of the wheels in those cars where you have witnessed such injurious friction?

Ans. to X Int. 114. I never measured them; but, from their appearance, I should judge from four feet to four feet six inches apart. They might be a little more than that. I cannot state more positively, as I never examined them with a view to judge of that distance.

X Int. 115. Do you mean to say, that these cars upon trucks had axes four feet to four feet six inches apart, and which thereby had unnecessary friction, embodied any mechanical principle or mode of operation different substantially from cars such as are described and claimed by Winans' patent?

Ans. to X Int. 115. I do not mean to say, that they embodied a different mechanical principle, but were defective, as viewed in relation to the curve to which I referred. They worked well upon other parts of the road.

X Int. 116. Would said cars have embodied any new mechanical principle, if the bearing points had been two feet further apart?

Ans. to X Int. 116. I think they would; for I think they would then have been inoperative.

X Int. 117. If they had not been inoperative, how would it then be?

Ans. to X Int. 117. If by not being inoperative is meant, that it would operate usefully, I think the principle would be the same.

X Int. 118. Have you not stated that there are three things which are essential to constitute a car substantially the same as that described and claimed in the patent? If so, will you please to recapitulate the same?

Do you, or do you not, mean to be understood, that all these three things must be united in one car, and act in mutual relation to or combination with each other, in order to constitute that particular improvement upon the eight-wheel railroad car, which is substantially the same as that described and claimed in the Plaintiff's patent?

Ans. to X Int. 118. The three things which I have described as essential, as inquired of, are the arrangement to avoid friction of the wheels upon the curves, that is, placing the wheels in a truck near together, which gives free motion under the car; the arrangement to give stability of motion to the car, which is placing the bearing points of the body upon the trucks remotely from each other; and the arrangement which permits the car to work in a train with other cars, which is applying the draft to the body in that connection. And all these three things must be united in one car, and act in mutual relation to or combination with each other, in order to constitute the entire improvement described and claimed in the patent.

X Int. 119. Did you or not consider the improvement claimed in the patent to be for a combination of old parts?

Ans. to X Int. 119. Not strictly, because a combination of the same old parts may be made, which will not develop the results due to the particular manner of combining those parts, as described in the patent, which may be better described by the term arrangement.

X Int. 120. Will you explain the meaning of the words combination and arrangement, as you have used them in your last answer?

Ans. to X Int. 120. By combination I understand the coöperation of several things to produce one common result. Arrangement has more particular reference to the relative position of such parts, and the relation in which they stand to each other in space.

X Int. 121. As to the car described in the Chapman patent, will you please answer the following questions:—

Had it a body? If so, how long?

Ans. to X Int. 121. There is *no car* described in the Chapman patent; therefore I cannot answer.

X Int. 122. As to the thing described in the Chapman patent, will you please answer the following questions:—

Had it a body? If so, how long was it?

Ans. to X Int. 122. The locomotive engine described in the Chapman patent has a body, or framing, on which the engine is mounted. I cannot tell what the length represented is, either from the drawing or the description.

X Int. 123. What is the length of the *six-wheel car* represented on the plate as compared with the width of the track?

Ans. to X Int. 123. There is *no six-wheel car* represented on the plate. The length of the dotted line in figure 8, which may be con-

sidered as representing the length of the *framing of the engine*, is about three and one third times the width of the track.

X *Int.* 124. What would the length of the framing have been to have been adapted to the two trucks of four wheels each, measured in relation to the width of the track?

Ans. to X Int. 124. I cannot tell, either from the drawing or the description.

X *Int.* 125. Were the two trucks, mentioned in said patent, capable of being placed under one framing, swivelling trucks?

Ans. to X Int. 125. They were.

X *Int.* 126. At what distance were the bearing points of the wheels in each truck, as compared with the width of the track?

Ans. to X Int. 126. The distance of the bearing points of the wheels of the truck, or "transom," as it is called, as shown in figure 8, is a little less than the width of the track. Whether any modification was to be made in case it were found necessary to use two transoms, is not stated.

X *Int.* 127. How far from each end of the body were the trucks to be placed, compared with the width of the track, when two trucks were to be used under one framing?

Ans. to X Int. 127. The description does not state.

X *Int.* 128. At what distance from the end of the body would they be placed by a mechanic having the patent and drawing before him, aided by such knowledge as an ordinary builder of cars must at that time have been presumed to have?

Ans. to X Int. 128. I can only state as a matter of inference. Judging from the description before me, I should say that he would place them in such position under the body, as would divide the weight equally upon each; and second, so that the wheels would be about equal distances from each other on the rails.

X *Int.* 129. Would the distances of the trucks apart depend on the length of the framing?

Ans. to X Int. 129. Not necessarily. From the information which I derive from the description, and from other old books, such as *Tredgold*, already referred to, if no reference was had to any thing except dividing the weight upon the wheels, that the bearing points of the body would have been one-fourth of the length of the car-body from each end.

And in answer to the following direct interrogatories, resumed by C. N. Curtis, Jr., Esq., Solicitor of the Plaintiff, the said Deponent further deposeth and saith:—

It is agreed that the Counsel for the Defendants may resume his cross-examination after the reëxamination of the Plaintiff, with the same effect as if it had not been suspended.

Direct Int. 1, resumed. Please examine the copy of Letters Patent granted to Jonas P. Fairlamb, Jan. 19, 1833, and the specification attached; and state whether, in your opinion, a car substantially simi-

lar to that claimed by the Plaintiff is therein described. If not, what kind of a car is therein described, and wherein does it differ from that of said Winans? (See Appendix, page .)

Ans. to direct Int. 1, resumed. I have examined a certified copy of the Letters Patent granted to Jonas P. Fairlamb, Jan. 19, 1833, and the specification and drawings attached. There is no such car as that claimed by the Plaintiff described in the specification, or in any way alluded thereto. The invention claimed and described is that of an improved manner of arranging the axles, and their boxes, of a railroad car, such as were then in common use. Figure 1 of the drawing annexed, and figure 3, show that particular mode of arrangement. Figure 2 shows a construction of car somewhat similar to Plaintiff's; the wheels in one of the trucks in which, appear to be fitted with boxes similar to those described in the patent, and the other not. It is referred to in the margin of the drawing by two letters of reference, A. A; but no corresponding letters are upon the figure in the copy which I have before me. The arrangement described in the drawings, and corresponding with the specification, is that of a four-wheel car with the improvement applied thereto, and no allusion whatever is made to such a construction of car as is shown in figure 2.

Direct Int. 2, resumed. Please examine the truck shown in figure 2, and state if they are constructed in the same manner as the arrangement shown in figure 1. If not, wherein do they differ?

Ans. to direct Int. 2, resumed. The truck shown in figure 2, on the left, has the boxes of the axles arranged similarly to those in figure 1; but it is wanting in respect to the circle marked C, figure 1, attached to the axles, and the friction rollers, marked E, which act in connection with them, and guide the axles so as to swivel truly under the body. This part of the arrangement is entirely wanting in figure 2, and without it I think the truck would be utterly inoperative. The trucks are arranged apparently to swivel under the body, and attached to a long car-body near each end, all of which is wanting in figure 1.

Direct Int. 3, resumed. Supposing that the idea shown by the dotted line in figure 1, in the plate attached to Chapman's description, had been carried out, where would the point of draft of the train have been in that case?

Ans. to direct Int. 3, resumed. It would probably have been from the engine carriage, if drawn by one end, or from the little carriage at A, if drawn by the other end.

Direct Int. 4, resumed. Please explain, by any practical illustration within your knowledge, what you mean by your answer to the 64th cross-interrogatory.

Ans. to direct Int. 4, resumed. I would explain it in this way: The friction of the wheels of a truck upon the rails is in proportion to the force by which they are pressed in contact with each other; and the force is in proportion to the resistance which the truck offers to moving to any position required by the wheels in following the surface of the rails, so that the minimum of friction is obtained by giving to the truck a maximum of freedom of movement, so far as concerns their guidance. If the surface of the rails be even, the friction will

be least when the truck moves most steadily; but, if the rails are uneven, it moves with least friction when the truck is at liberty to conform to the surface of the rail.

Direct Int. 5, resumed. Whether or not, in your opinion, would trucks constructed in the manner shown in the drawing attached to the plaintiff's patent be practically useful and safe? If yea, why?

Ans. to direct Int. 5, resumed. I think they would, because I believe I have seen cars so constructed.

October 11, 1853. — CROSS-EXAMINATION *resumed.*

In answer to the following cross-interrogatories, resumed by William Whiting, Esq., the said Deponent further saith, viz. —

X Int. 1, resumed. Do you believe in the existence of a Supreme Being, who will punish perjury?

The Solicitor for the Plaintiff objects to this interrogatory, as incompetent to be put at the present time, the witness having been duly affirmed under the pains and penalties of perjury.

Ans. to X Int. 1, resumed. Being instructed by the Commissioner that it is my duty to answer the question, I answer, with my understanding of the question, I do.

X Int. 2, resumed. You say, "With my understanding of the question, I do." Will you state whether you mean, by your understanding of the question, any different understanding from that which the words in their ordinary and usual meaning purport?

The Solicitor for the Plaintiff objects to this interrogatory, for the reasons stated in the preceding interrogatory.

X Ans. to Int. 2, resumed. As the Commissioner instructs me that it is my duty to answer this question, I cannot tell, in the great diversity of religious opinion, what the ordinary and usual meaning of the words, "Supreme Being," and "perjury," is. I do understand them differently from some of the religious opinions that are common in the community, and therefore I do not think it right for me to take an oath; but, in making affirmation, I mean precisely what the words imply in their usual signification, without any mental reservation or interpretation different from that usually received by the community, and thereby subject myself to all the pains and liabilities which attach to a false testimony. The witness stand is, in my estimation, not a proper place for fictions, legal or otherwise. I mean by "*the words*" used in the phrase commencing, "I mean precisely what the words imply," the *words* used in affirmation. So far as I know, the majority of the community believe, and the usages of the Courts seem to me to contemplate, that the punishment of perjury by the Supreme

Being is greater than for any other form of falsehood. I do not so believe, and therefore cannot conscientiously take the oath upon that assumption.

X Int. 3, resumed. Do you believe in the existence of a Supreme Being?

The Solicitor for the Complainant objects to this interrogatory, for the reasons stated *supra*.

Ans. to X Int. 3, resumed. As I have already answered, I do.

X Int. 4, resumed. Do you use the words of the last question and answer in their usual and ordinary signification in the English language?

Ans. to X Int. 4, resumed. I cannot answer the question, as the words are usually and ordinarily used with a diversity of signification. I use them as they are used, as I believe, by many people, and differently from others. I cannot answer more definitely.

X Int. 5, resumed. Do you use the word "*perjury*" in the phrase "pains and penalties of perjury" in any different sense from that in which you understand to be the ordinary use and signification thereof? If so, state what you mean by the use of the word in your answers.

The Solicitor for the Complainant objects to this interrogatory, for the reasons stated *supra*.

Ans. to X Int. 5, resumed. I do not, so far as it defines a crime against man; but as a crime against the Supreme Being, I regard it, I think, differently from the majority of the community, but do not know. I regard it as a falsehood simply.

X Int. 6, resumed. Will you explain what you mean by the language used in your answer to the 5th interrogatory, "as a crime against the Supreme Being," "I regard it," perjury, "as a falsehood simply"?

Ans. to X Int. 6, resumed. I mean what the language obviously implies. I cannot make it plainer.

X Int. 7, resumed. In any of your answers, do you mean to be understood, that you believe in the accountability of man to the Supreme Being for the crime of perjury?

The Solicitor for the Plaintiff objects to this interrogatory.

Ans. to X Int. 7, resumed. Under instructions from the Commissioner, I state that I believe in a Supreme Being that will punish perjury, and decline to answer any further questions in relation to my religious belief.

WM. C. HIBBARD.

UNITED STATES OF AMERICA, }
 DISTRICT OF MASSACHUSETTS, ss. }

I, Elias Merwin, a Commissioner duly appointed by the Circuit Court of the United States for the District of Massachusetts, under and by virtue of an "Act for the more convenient taking of affidavits, and bail to be used in civil causes depending in the Courts of the United States," passed February 20, 1812, and the acts in addition thereto, do hereby certify, that the time and place of taking the foregoing deposition were agreed upon by the parties in the caption of the deposition named; that on the 20th, 21st, 22d, 23d, 24th, 26th, and 27th days of September, and on the 11th day of October, A. D. 1853, I was attended by C. P. Curtis, Jr., Esq., Solicitor of said Complainant, by William Whiting, Esq., Solicitor of the Respondents, and by the said witness; and the witness was by me first duly examined, and cautioned and affirmed to testify the whole truth; and the testimony by him given was by me reduced to writing, and thereafter subscribed by the witness in my presence; and that I am not of counsel or attorney to either of the parties, nor in any way interested in the event of the cause named in the said caption.

ELIAS MERWIN, *U. S. Commissioner.*

UNITED STATES OF AMERICA.

SOUTHERN DISTRICT OF NEW YORK, }
 CITY, COUNTY, AND STATE OF NEW YORK, ss. }

BE IT REMEMBERED, That on this 28th day of October, in the year of our Lord one thousand eight hundred and fifty-three, I, John W. Nelson, a Commissioner, duly appointed by the Circuit Court of the United States for the Southern District of New York, in the Second Circuit, under and by virtue of the Acts of Congress, entitled "An Act for the more convenient taking of affidavits and bail in civil causes, depending in the Courts of the United States," passed February 20th, 1812, and the Act of Congress, entitled "An Act, in addition to an Act, entitled 'An Act for the more convenient taking of affidavits and bail in civil causes, depending in the Courts of the

United States,'” passed March 1st, 1817, and the Act entitled “An Act to establish the Judicial Courts of the United States,” passed September 24th, 1789, did call and cause to be and personally appear before me, at my office, at the new City Hall, in the City of New York, in the said Southern District of New York, in the State aforesaid, James J. Mapes, to testify and the truth to say, on the part and behalf of the Plaintiff, in a certain suit or matter of controversy, now depending and undetermined, in the Circuit Court of the United States for the District of Massachusetts, wherein Ross Winans is Complainant, and the Eastern Railroad Company is Defendant.

And the said James J. Mapes, being about the age of ——— years, and having been by me first cautioned and sworn to testify the truth, the whole truth, and nothing but the truth, in the matter of controversy aforesaid, I did carefully examine the said James J. Mapes; and he did thereupon depose, testify, and say as follows, viz.:—

Ques. 1. What is your name, age, residence, occupation; and how long have you been so engaged?

Ans. James J. Mapes, aged forty-eight years, residence Newark, New Jersey; occupation, Consulting Engineer; and have been so engaged for twenty years past.

Ques. 2. To what class of subjects has your attention been directed, and what degree of attention have you given to such subjects?

Ans. I have been employed as a consulting engineer, engaged in the construction of machinery, and as an expert in patent cases. I was President of the Mechanics' Institute for many years; and Chairman of the Committee of Arts and Sciences of that Institution, and of the American Institute, the duty of that Committee being to examine inventions and report upon their usefulness and the inventors' applications, and award premiums, &c.

Ques. 3. Whether or not have you been in the habit of examining mechanisms with a view to forming an opinion as to their respective similarity or identity; and, if yea, to what extent and for how long?

Ans. I have been so employed occasionally during the whole term named.

Ques. 4. In what districts have you been examined as an expert in patent cases, and upon what classes of subjects? How many years have you been so engaged? Please enumerate the cases in which you have so testified in the Massachusetts District.

Ans. I have been engaged in the Massachusetts District; at Hartford, New Haven, New York, Philadelphia, Trenton, Albany, &c.; at Boston in the Bigelow Loom case, and Colt's Pistol case, Carver's Cotton-gin, and some other cases which I do not now recollect.

Ques. 5. Have you examined Letters Patent issued to Ross Winans of Baltimore, dated Oct. 1, 1834, with the drawing and specification thereto annexed? If yea, please describe the invention therein claimed, as you understand the same; and state what the condition of railroad science was prior to the said invention, and what difficulties existed which were to be overcome. (Page 3, and Appendix, page .)

Ans. I have examined such Letters Patent, with the drawing and

specification thereto annexed. I understand the invention of Ross Winans to consist of a peculiar arrangement composed of two truck-frames containing four wheels each, which trucks support the car-body, and are independent of it in their action; thus being rendered capable of fitting themselves to the sinuosities of the road when moved at high velocities, rendering the turning or following curves comparatively easy and free from danger, as compared with the methods before in use; the propelling force being applied to the car-body frame, and not to the truck-frame, constitutes one of the advantages of the arrangement, and gives rise to other advantages not embraced by the former methods.

The old four-wheel car was necessarily subjected to all the jar consequent upon absolute momentum arising from any inequality of the road, and increased in its effect on passengers, seated at or near the ends of the cars. Such shocks, by the arrangements of Mr. Winans, are diminished, and divided by the flexible action of each truck, so as to reach the mass of the car in a mode more resembling continued force than absolute momentum. I would describe the difference between these two by saying that the driving of a nail with a hammer would represent absolute momentum, while forcing it to its place with a lever would relatively represent continued force; as, incidental to this arrangement, the weight of the car is divided over a greater amount of surface of rail, giving stability; and the car is rendered capable of forming part of a continuous train, the trucks suiting themselves to the necessary change of position required. And in turning curves, the close approximation of the wheels in each truck causes them to exert less friction upon the rails than when pulled or moved by the truck-frame, or than when the wheels are divided in a different manner relatively to each other.

Prior to said invention, the difficulty of turning curves arose from the want of stability in the arrangement of wheels, axles, &c., and hence shorter cars were required to be used; whereas, by the present arrangement, cars double the length are rendered readily practicable at higher speed.

Ques. 6. What experience, if any, have you had in railroad engineering, or collateral science, which enables you to give your opinion, and make the above statements?

Ans. I have been often consulted by those who have been engaged in railroad engineering, have occasionally passed over roads at the request of parties in interest, for the purpose of assisting them in their examinations, and have a general knowledge of such sciences as are collateral to such constructions; and have been in the habit of lecturing on mechanical philosophy, physics, &c.

Ques. 7. Over what period of time has your said experience extended?

Ans. Since the introduction of railroads in this country, more or less.

Ques. 8. Please state what in the said patent induces you to state, that the point of draft must be from the body of the car, and not from the truck-frame. State all the grounds of your opinion, and with what degree of importance do you regard that point.

[Objected to as leading and assuming facts not testified to by witness.]

Ans. I consider the flexibility of the truck or independence of the propelling force as a new element in this invention. It is evident that the inventor has not changed the place of attachment for draft as compared with the former four-wheel cars, *but has placed under them the flexible trucks in the manner described in his patent.* Independent of what may arise in the specification, the words in the claim, "so as to accomplish the end proposed," could not be brought about if the attachment was to the truck-frame, instead of the car-frame.

Ques. Please state whether, in the drawing attached to the patent, you perceive any point of draft indicated. If yea, where and in what manner is it shown?

Ans. I do. I see in the end view a bolt let through the car-body frame, evidently for that purpose.

Ques. 10. How much, if any, side-bearing between the upper and lower bolster, is shown upon the drawing attached to the patent? And whether or not, in your opinion, would such amount of side-bearing be sufficient to enable a car so constructed to run with ease and safety at a speed of twenty miles per hour? If not, wherein would it be deficient?

Ans. I should consider the side-bearing, as here represented, to be about three feet, and to be entirely sufficient for all practical purposes.

Ques. 11. Please state whether or not, in your opinion, a car constructed with such trucks as are specifically described in the specification, would be practically useful, or otherwise, at a speed of twenty miles per hour for passengers or freight. If not, wherein would it be defective? If yea, what peculiar advantages would it possess?

Ans. I believe a car so constructed with such truck would be practically useful; and one of the advantages to arise from such construction would be, that, in passing a curve, the greater amount of weight being impinged by centrifugal force on the spring on the outer side of the curve, would force these two wheels rather wider apart than those on the inside; thus accommodating the form of the truck to the requirements of the curve, and rendering friction between the rails and wheels less, from such alteration of figure. It also embraces the other advantages I have before referred to, such as the lengthening of the car, doing away with the jolt or jar, and causing the seats throughout the car to be alike comfortable to passengers; and the danger of the car being thrown off the track by centrifugal force is materially lessened, the liability of the inertia of the cars being assisted by friction on the rail not being likely to occur.

Ques. 12. Are you familiar with the eight-wheel cars now in common use upon the railroads of this country? If yea, please state whether or not, in your opinion, the common eight-wheel car is substantially the same as that described and claimed by the Plaintiff in his said patent; and, if not, wherein does the same substantially differ?

Ans. I am acquainted with the eight-wheel cars in common use,

and believe them to be substantially the same as those described in the patent.

Ques. 13. What is the customary size of the wheels of railroad cars in this country, and what length of time has that size obtained?

Ans. I cannot be definite as to the length of time. The size is from thirty inches to three feet, as near as I can recollect.

Ques. 14. How, if at all, does that size differ from those in use at the time of the Plaintiff's invention; and what is the size of those shown in the drawings?

Ans. The size of those shown in his drawing is thirty to thirty-three inches. I am unable to state the size used at the time of the Plaintiff's invention.

Ques. 15. Whether or not, in your opinion, would the arrangement of the wheels in the trucks, in such a manner that their points of contact should form a square, all other parts of the arrangement of the car being as described in the patent, make such a difference as not to remain such a car as is claimed by the Plaintiff? If not, why?

Ans. I believe the arrangement forming a square, the points of contact of the wheels, is incidental to the Plaintiff's arrangement, and, when adhered to with the view of being precisely square, forms no difference from the plan suggested by him; such difference, if any, being formal, and not substantial.

It is evident that a single pair of wheels on a flexible axle could not maintain their direct line of travel on the rails; while, if attached to a frame, on another part of which is a separate axle and pair of wheels parallel to the first, or nearly so, they have the effect of preventing each other from commencing a line of divergence from the line of travel, and the distance apart relatively suggested by the patentee would necessarily differ but little, if at all, from a square. At any rate, wheels of a proper diameter, as demanded by practice, cannot be arranged in a truck, in the manner described by the patentee, without being a sufficient distance apart to equilibrate the line of travel with each other. Any variation between an exact square and that position suggested by the patentee, in my opinion, would be unimportant to the action of the truck.

Ques. 16. Upon what guage of track is your last answer founded?

Ans. Four feet and approximating distances, with wheels varying from thirty inches to three feet.

Ques. 17. Have you examined the specification and drawings of a patent issued to W. and E. W. Chapman, in the Repertory of Arts, vol. 24, second series, London, 1814? If yea, please state what kind of a machine is there described, for what purpose and upon what kind of road it was to have been used.

Ans. Yes. It is a machine moved by the rotation of a drum or cylinder, embracing a chain capable of use only at low speeds, and not susceptible of being moved at such velocity as is required on modern railroads. The inventor of that locomotive introduces six or eight wheels for the definite purpose, as he asserts, of dividing the weight more equally upon the rails, and for no other purpose; the length of the engine there described gives evidence of its ability to

turn moderate curves, independent of this arrangement; and the purpose of the inventor is evident, as he states, to divide the load. The passage of a chain around a drum is not analogous to the attachment of the propelling force to the platform on which that drum rests; the power here is applied to alternate the position of the relative parts of the chain; and the motion of the engine is a consequence of this action, which cannot be applied practically to high velocities. I make these remarks to render it understood that the end of the engine, containing this chain or drum, is necessarily pulled downward or upward as the case may be, rendering the *motor* a part of the load; and thus, from inequality of weighting from such cause partly doing away with the equilibration, giving unequal results of friction.

Ques. 18. Whether or not do you consider that the said engine, or any thing therein described, embodies the principles, or is substantially the same as the invention, of the Plaintiff? If not, wherein does it differ?

Ans. I do not consider them substantially the same; their purposes being different, the intention of the inventors as expressed by themselves being different, and the one not being capable of being substituted for the other. I see no arrangement in this machine by which the axles or their attachment are rendered entirely free and independent of the frame to which the propelling power is applied; the last arrangement, or that of approximating the most nearly to modern cars, leaving one end of the car subjected to all the disadvantages of jolt and jar, as before described. As a whole, I consider the invention entirely impracticable, and cannot but doubt its ever having been put in use.

Ques. 19. Whether or not, in your opinion, would it require invention in a mechanic of ordinary ability, with the said *engine* before him, to construct such a railroad *car* as is described by the said Winans? And, if not, for what reason?

Ans. Yes, it would require invention, the differences in arrangement and result being substantial, and not formal.

Ques. 20. Have you examined the description of a locomotive engine, in Nicholas Wood's Treatise on Railroads, London, 1825? If yea, please describe the construction of said *engine*, as you understand it to have been.

Ans. I understand this to be an engine intended for tram-ways, having eight wheels for the purpose of dividing the weight, which wheels are moved by gearing, which, after a careful examination, I believe cannot be kept in gear if the engine be run on curves. The propelling power is not independent of the trucks, but is made to pass through them by direct application.

Ques. 21. In what manner do you understand that the trucks under the engine were attached thereto; and what kind of motion have they, and what induces you to be of that opinion?

Ans. I see no provision in these trucks for flexibility of action. The bolsters seem to be sunken in rigid seats. And, as the machinery suspended in the truck-frame gears with the machinery suspended in the boiler-frame, the parts could not maintain their relative posi-

tions, if oscillations of either a vertical or horizontal character should occur.

Ques. 22. Whether or not, in your opinion, does the said engine, as described in the text, or shown in the plate, embody the essential characteristics of the Plaintiff's arrangement; and, if yea, what elements does it lack?

Ans. It does not embody the essential elements of the Plaintiff's arrangement. It lacks the flexibility of truck-frames, and their independent action; nor do I believe them capable of pursuing curves other than of such a radius as would admit its entire length to the curve. A remark appended to the description of this machine in said Wood's treatise, page 150, acknowledges the liability of this contrivance to pass off the road in attempting to turn curves.

Ques. 23. Will you please to quote the language you refer to?

"But the engine can also drive the carriages in front by propelling them forward; but this is very liable to drive the carriages from off the road, especially when turns or curves in the line of road occur." Wood, again, at page 145, says: "Mr. Chapman, in his patent for the application of a chain, described a plan of placing the weight of the engine upon two frames supported by six or eight wheels; and the Wylam engines, being heavier than the rails would bear, were placed upon eight wheels; but the complication attendant upon so many wheels, and the unwieldy nature of such a length of framing, formed altogether so many objections as to render them almost useless, as a species of moving power." At page 156 he says: "The railroad on which these engines travel being too weak to support the weight divided on four wheels, recourse was obliged to be made to eight wheels; and this rendered the use of so many cog-wheels necessary to obtain the adhesion of the whole weight of the engine."

Ques. 24. By what plate, if any, in Wood's treatise is the Wylam engine represented?

Ans. Plate six.

Ques. 25. Where was the point of draft on the said engine? by the body or by the truck?

Ans. It must be said to be by the truck, inasmuch as the power resolves itself on every one of the axles, and they are dependent on, and not independent of, the propelling force.

Ques. 26. Have you examined the treatise on railroads by T. Tredgold, 1825, and the description and plate of an eight-wheel carriage therein? If yea, please describe the construction of said carriage, and state what was the manner of connection of the trucks with the body, as shown by the plate and described in the text.

Ans. The connection in the text, but not in the drawing, proposes an activity on the part of the truck for accommodating itself to differences in level of the rail between the two sides, which is common to all wagons: the attachment of the horse is expressly stated in the description of the plate, fig. 28, to be to the truck, and not to the body-

frame above. The size of the wheel, given at page 95, in connection with the line C, as given in the drawing, fig. 28, puts it beyond a doubt that the propelling force was attached to the truck.

Ques. 27. Whether or not, in your opinion, was it intended that the truck-frames under said cars should swivel, if at all, laterally or vertically; and upon what do you found your opinion?

Ans. I see nothing, either in the description or drawing, to warrant the belief that these trucks had any such oscillating action, or any other than what is common to the mere elasticity or spring of the material, as usually appealed to in horse-carts of all descriptions.

Ques. 28. What means are proposed by the author of that treatise to obviate the difficulty of passing round curves?

Ans. I recollect of none.

Ques. 29. Please look upon the 164th page of said treatise, and state what is there stated upon this subject.

Ans. It there states: "Wherein the direction deviates from a straight line, the wheels that are fixed on a single axis must one of them be dragged forward, and the other pushed backwards; and therefore we would prefer making the wheels revolve on fixed axles, because they must do less injury to the wheels and rails of the curved parts of the road, and require less power when, under any arrangement, there must be some lost by lateral rubbing against the guides."

Ques. 30. What was the object for which the said car was to be put on eight wheels, and whence do you derive your information?

Ans. The object was to divide the weight; and I derive my information from the description in Tredgold, where it states on page 94, and again on 179, that to be the object of the increased number of wheels; and it there states, that, by such increase of wheels, the load may be increased to six or eight tons without requiring expensive rails. It also states the load on each wheel must be limited to suit the strength of the rail.

Ques. 31. Whether or not, in your opinion, is the car with eight wheels described and shown in Tredgold's treatise substantially the same as that described by the Plaintiff? If not, wherein would it differ from the Plaintiff's car?

Ans. It is not substantially the same. The wheel-frames have not an independent action, nor are they placed relatively to each other according to the arrangement of the Plaintiff: they were not intended for analogous purposes, and do not produce analogous results.

Ques. 32. Whether or not, in your opinion, would such a car be practically useful for passengers or freight on a railroad at a speed of twenty miles an hour? If not, what modifications or alterations would be necessary to make it so?

Ans. The wheels in each frame would require to be brought closer together, the frames themselves relatively at greater distances from each other, and supplied with all the necessary changes that would give them independent action from that part to which the propelling force is applied.

Ques. 33. Please examine the drawings shown you, marked "J. W. N. U. S. Com." (Quincy car, see drawing "2"); and state whether or not in your opinion a car constructed according to said drawing, with the two trucks swivelling laterally, would embody the characteristics of, or be substantially the same as, that described by the Plaintiff; and, if not, how would it differ?

Ans. It would not be substantially the same; the trucks would not have an independent action to adapt themselves to the inequalities and configuration of the rail; the power here being applied to the truck, instead of the car-body frame; both the purpose and position of these trucks are foreign to the purposes of the patentee. It seems to be a contrivance for carrying materials of great weight, and with a view of dividing that weight over two trucks instead of one. It contains no provision for preventing shocks, and is not otherwise analogous to the Plaintiff's arrangement.

Ques. 34. Suppose two four-wheel platform-cars were to be connected, at some distance apart, by a board, and long timbers placed thereon, their ends resting on a swivelling bolster, and drawn by the forward car; would such an arrangement, whether permanent or temporary, in your opinion be substantially the same as the invention of the Plaintiff? If not, how would it differ?

Ans. It would not be the same: in the Plaintiff's arrangement, the propelling force is applied to the body, while the guiding element exists distinctly in the rails themselves; the flexible character of the trucks constitutes one of the novelties of his arrangements. In the case supposed, the propelling is also in part the guiding force, and in that particular differs from the Plaintiff's arrangement.

Ques. 35. What do you mean to be understood by the use of the word "flexible" in connection with trucks, in your deposition?

Ans. I mean the arrangement of the Plaintiff,—such a truck as from its own elements can maintain the line of travel of the wheels relatively to each other, even when passing curves, and, while sustaining a propelled cargo, resting on these frames or trucks.

Ques. 36. Do you or not consider the placing of a laterally-swivelling four-wheel truck under the front of a locomotive-engine, whose driving-wheels have rigid axles, as so far to embody the essential elements of the Plaintiff's invention as to be substantially the same? If not, wherein is such arrangement deficient?

Ans. I do not consider such an arrangement as essentially the same. The Plaintiff's arrangement embraces the use of *two such trucks; and in their use in the manner described jointly*, they correct the difficulty of jolt, jar, excess of friction, and ability to double the length of the car, which are new results consequent upon the arrangement of two trucks, flexible in their character and position, substantially as set forth by Plaintiff. The antagonisms consequent upon the old arrangement are remedied by the arrangement of Plaintiff, and only compromised by the supposed case above. Such an arrangement as the one proposed could not take effective place in a train of cars, as does each car under Plaintiff's arrangement.

Ques. 37. Have you seen the Letters Patent issued to Jonas P.

Fairlamb, dated Jan. 19, 1833 (see page), and the specification thereto attached? If yea, please state whether you find in said specification any description or suggestion of a car substantially the same as the said Winans' car? If yea, will you point it out?

Ans. I see nothing in the specification to lead me to suppose that the arrangements are similar. Such play of axle would be fatal in a flexible truck.

Ques. 38. Have you seen the specification attached to Ephraim Morris' patent marked "E. M. U. S. C." (see page)? and if yea, have you seen such a car as is therein described in operation? If yea, please describe the said car, and state for what use it was intended and used.

Ans. I have seen this car in operation; and its use is to carry canal boats over an inclined plane, having no analogies in use or result to the arrangement of the Plaintiff.

Ques. 39. Suppose a person of ordinary mechanical ability, having knowledge of all the machines and cars already alluded to in your deposition as prior to the Plaintiff's invention, would it or not, in your opinion, require invention for such person to construct the car of the Plaintiff? and, if not, which of the said machines would render the exercise of invention unnecessary under such circumstances?

Ans. I have seen no machine among those presented, containing such functions as, by the exercise of mechanical skill alone, could produce the arrangement of the Plaintiff, or capable of producing similar results. The practical advantages arrived at by the arrangement of the Plaintiff are distinctly the result of invention.

Ques. 40. Please state what distinguishing characteristic there is, if any, either in construction or purpose, which distinguishes the invention of the Plaintiff from all those which preceded.

Ans. In construction the use of two flexible trucks, so configured as to be guided by the rails, independent of the propelling force, is not to be found in any of the plans submitted to me other than that of the Plaintiff.

Ques. 41. Please examine the drawing shown you marked "Columbus;" and state whether or not, in your opinion, it represents a car substantially the same as the Plaintiff's car. If not, wherein does it differ?

Ans. The car Columbus, as represented in this drawing (see drawing marked Columbus), is analogous to two small car-frames or trucks, surmounted by a car-body, of double length. The mode of attachment for propelling renders the propelling force, in part, a guiding force, and therefore does not leave the two smaller frames or trucks with independent flexible action. Their relative position is not such as can be fairly deduced from the language of the Plaintiff's specification, each half of the upper car being the representation of an old-style car, drawn by a perch, or its equivalent.

Ques. 42. Whether or not do you find, in the description or plans of any of the said cars or machines alluded to in your deposition, any suggestion of lengthening the body of the car *for the purpose of attaining stability of motion*? and, if yea, please state where such suggestion occurs. If not, what do you find to the contrary?

Ans. I find no such suggestion, except in the patent of the Plaintiff. And this forms one of the distinguishing features of his arrangement; enabling long loads to be carried without rendering the passing of curves impracticable. The patentee gives evidence of this being one of his intended results, from the manner in which he directs that his trucks shall be moved to a great distance from each other.

Ques. 43. Please state whether, in the use of the word "flexible," as applied to trucks, you mean such trucks only as are described in the Plaintiff's specification *with springs?* or do you simply mean trucks swivelling with perfect freedom, *without the restraint of draft?*

Ans. A truck is not entirely flexible, at least none that have been here exhibited, unless it be the Plaintiff's truck. The action of the spring when impinged upon by a centrifugal force, as I described when answering a former question, is peculiar to the Plaintiff's truck, and adds a novelty to its arrangement, as compared with others. The truck without this, however, as used in the Plaintiff's arrangement, contains elements peculiar to that arrangement.

Ques. 44. Whether or not, in your opinion, would the construction of such a car as is described in Plaintiff's specification require the exercise of the inventive faculty *after* the construction of the car Columbus? If yea, in what manner?

Ans. Yes, it would require the inventive faculty; first, in applying the propelling force to the upper body-frame, leaving the trucks free to be guided by the rails; and, second, in the placing, and also difference of construction, of these trucks and their supports, so as to accord with the arrangement of the Plaintiff.

Adjourned to 29th October, 1853, to 9½ o'clock.

CROSS-EXAMINED.

Oct. 29. — *Counsel and Witness present.*

X *Ques. 1.* Will you please annex to your answer the copy of the specification and drawing you have used in making your examinations and answers?

Ans. Here it is. (See page 3, and drawing "A.")

X *Ques. 2.* Is the relief from shocks and concussions, and from lateral vibrations materially varied by increasing or diminishing the length of the body, while the extreme ends of it continue to rest on the bolsters of the bearing cars; the load being supposed to be equally distributed over the entire length of the body. If so, why? if not, why not?

Ans. That the reply to the latter part of this question may be clearly understood, I would state that, if a car-body was supported directly over one pair of axles, each axle removed to a considerable

distance from the end of the car, then any interruption on the rail which should be impinged upon by either of the wheels would give a jolt or jar to the car, and this jar would be more severely felt by those seated at the ends of the car, from the fact that the distance from the point of interference of the wheel to the end of the car would be such as to cause the end of the car to be moved with a jolt through more space in the same length of time than the portion immediately over the wheel. If such a body as there described should be doubled in length, with each end resting as per arrangement of Plaintiff on his trucks, the jolt or jar would be lessened, for the causes named in my direct examination; the difference in amount of jolt between a long car and one comparatively shorter, both with the Plaintiff's arrangement, would be due to the spring or elasticity of the car-frame. The amount of this difference would be slight, but certainly less with a longer car, from the comparatively greater yielding of the material; and the same rule would hold good with all sorts of cars.

X Ques. 3. Do you consider this difference which is due to the greater elasticity of the material of the longer body a difference in *principle* of construction or mode of operation. If so, why?

Ans. The difference referred to in the last part of my answer is simply a consequence of greater length, and is not the difference referred to in my direct examination between the jolt of the Plaintiff's car and those previously in use. In relation to the part of the question referring to difference of construction, I would answer, that, so far as a new arrangement may render a greater length necessary or practicable, it will include in its advantages the greater amount of subdivision of force or elasticity consequent upon such increase of length.

X Ques. 4. Is it a part of the plan of connecting the body with the trucks described in the specification, that the weight of the body should be borne upon the centre of the bolster; and is this part of the plan essential or not in order to make such an eight-wheel car as is described in Plaintiff's specification.

Ans. What would be understood, in mechanical parlance, as bearing on the centre of a bolster would include so much side bearing on the swivel and bolster as would render it practicable for the purposes intended; the bolster having no requirement in the case of a railroad car for the continuance of the swivel-bar in its bearing surface to the extreme end. There are many modifications of this action, as a swivel-ring on the bolster, and a corresponding one resting upon it, as in a stage-coach. The Plaintiff requires the arrangement he has named for this purpose or its equivalent, of which there are many in common use. I mean the latter part of my reply as an affirmative answer to the word "essential" in the interrogatory.

X Ques. 5. Does the increasing or diminishing the length of the body of the eight-wheel double-truck car (so as to make it longer or shorter than twice the length of the ordinary four-wheel car in common use on the Baltimore and Ohio Railroad in 1834) introduce or embody any new or different mechanical principle or mode of operation, while all other parts of the structure are unchanged?

Ans. If by the eight-wheel double-truck car, with all other parts of the structure unchanged, is meant the car of the Plaintiff, then any increase or diminution of its length not beyond the amount which would interfere with that arrangement, would not be a change of principle; but shortening such car would be, in ratio, an unnecessary parting with advantages, and comparatively increase the expense of construction.

X *Ques.* 6. Is there any limit of distance of the flanges from each other which must be observed by the builder, and which is laid down in the specification as essential to the construction of a car containing said Winans' improvement? If so, what is said limit, and how far may said distance be varied without exceeding such limit?

Ans. They should be at such distance as not to touch, and leave room for the intervening and superincumbent parts from the necessary diameter of wheels or those in common use. This will secure a distance equal to the necessities of the case for preserving directness in the line of travel, between the wheels of each axle, with the ordinary width of road. The limit of greatest distance apart between the wheels would be regulated in part by the radii of the curves of the road, as on a curve of short radius the advantages of the Plaintiff's arrangement would be lost by too great a distance between the wheels of the said truck, as was proved by the inefficiency of four-wheel cars.

X *Ques.* 7. What do you understand to be the meaning of the words "*analogous* and dependent upon the same principles," in the last clause of the claiming part of the Plaintiff's claim?

Ans. By the word "*analogous*" and its context, I should suppose it to mean the adaptation of such mechanical appliances to the uses named as are suggested for the arrangement, and would require simply the exercise of mechanical skill without invention for their adaptation. Of course I mean this beyond the *exact* mode as described by Plaintiff; in other words, I suppose him to desire to claim, and with right, the use of all mere equivalents, in place of those described.

The witness desires the following statement to be made in explanation of his answers to direct interrogatories, to wit: Wherever I have used the word "*flexible*" in the foregoing examination, I wish to be understood to mean such an arrangement of parts as admits of desired motion, but not to infer that any motion beyond desired will occur in Plaintiff's trucks as constructed; nor do I believe that any undesirable motion from the use as named can take place.

JAS. J. MAPES.

Subscribed before me, Oct. 29, 1853.

JOHN W. NELSON, U. S. Commissioner.

UNITED STATES OF AMERICA, }
SOUTHERN DISTRICT OF NEW YORK, ss. }

I, John W. Nelson, a Commissioner duly appointed by the Circuit Court of the United States, for the Southern District of New York in the Second Circuit, under and by virtue of the Acts of Congress, entitled "An Act for the more convenient taking of affidavits and bail in civil causes, depending in the Courts of the United States," passed February 20th, 1812, and the Act of Congress, entitled "An Act, in addition to an Act, entitled 'An Act for the more convenient taking of affidavits and bail in civil causes, depending in the Courts of the United States,'" passed March 1st, 1817, and the Act entitled "An Act to establish the Judicial Courts of the United States," passed September 24th, 1789, do hereby certify, that the reason for taking the foregoing *deposition* is, and the fact is, the *witness* is material and necessary in the cause in the caption of this said deposition named, and that *he* resides more than one hundred miles from the place of trial of said cause.

I further certify, that notification of the time and place of taking the said *deposition* signed by me, was made out and served on the

to be present at the taking of the *deposition* and to put interrogatories, if he or they might think fit.

I further certify, that on the 28th and 29th days of October, in the year of our Lord one thousand eight hundred and fifty-three, I was attended by Curtis for Plaintiff, and Whiting for Defendants, and by the *witness*, who was of sound mind and lawful age; and the *witness* was by me first carefully examined and cautioned, and sworn to testify the truth, the whole truth, and nothing but the truth; and the *deposition* was by me reduced to writing, in the presence of the *witness*, and from his *statement*; and after carefully reading the same to the *witness*, he subscribed the same in my presence. I have retained the said *deposition* in my possession for the purpose of transmitting the same with my own hand to the Court for which the same was taken.

And I do further certify, that I am not of Counsel nor Attorney for either of the parties in the said *deposition* and caption named, nor in any way interested in the event of the cause named in the said caption.

In testimony whereof, I have hereunto set my hand and seal, this 2d day of November, in the year of our Lord one thousand eight hundred and fifty-three, and of the Independence of the United States the seventy-eighth.

JOHN W. NELSON,

*United States Commissioner, duly appointed
by the Circuit Court of the United States,
for the Southern District of New York, in
the Second Circuit.*

UNITED STATES OF AMERICA, }
SOUTHERN DISTRICT OF NEW YORK, ss. }

I, John W. Nelson, Clerk of the Circuit Court of the United States of America, for the Southern District of New York, Second Circuit, do hereby certify that I am well acquainted with the handwriting of John W. Nelson, whose name is subscribed to the annexed certificate, and that the signature to the same is in his proper handwriting. And I do further certify, that he was, at the time of signing the same, a United States Commissioner, duly appointed under and by virtue of the Acts of Congress, in such behalf made and provided, by the Circuit Court of the United States of America, for the Southern District of New York.

In testimony whereof, I have hereunto subscribed my name, and affixed the seal of the said Circuit Court, this third day of November, in the year of our Lord one thousand eight hundred and fifty-three, and of the Independence of these United States the seventy-eighth.

JOHN W. NELSON, *Clerk.*

UNITED STATES OF AMERICA.

THE CIRCUIT COURT OF THE UNITED STATES, WITHIN AND FOR THE MASSACHUSETTS
DISTRICT.

MASSACHUSETTS DISTRICT, ss.

*To John Hanan, Levin Gale, or John Carrere, Esquires, United States
Commissioners of Baltimore, in the District of Maryland.*

Know ye, that reposing confidence in your wisdom, prudence, and fidelity, we have appointed, and by these presents do authorize and empower, you to take the answers to the interrogatories hereunto annexed, of D. P. Rennie, Mendez Cohen, and Emil Reuter, Esquires, of said Baltimore; also of J. H. Alexander, ——— Hazlehurst, James Murray, and Samuel J. Hayes, of said Baltimore, witnesses to be examined on behalf of the Complainant, and to be used in a certain cause now pending in said Court, wherein Ross Winans is Plaintiff, *vs.* The Eastern Railroad Company, Defendant, in equity.

And to this end, at certain days to be by you appointed for that purpose, to cause said witnesses, as aforesaid, to be brought before you, and each witness, while present before you, to examine carefully on oath touching the premises. And, when you shall have taken the examination as aforesaid, to reduce or cause the same to be reduced to writing, and to be subscribed by each of said witnesses in your

presence. And the same, so taken and subscribed, to return, together with this Commission and your doings herein enclosed, sealed and directed to the Circuit Court aforesaid, holden at Boston, as soon as the same may be executed.

In testimony whereof, we have caused the seal of the said Circuit Court to be hereunto affixed.

Witness, the Honorable Roger P. Taney, at Boston, this twenty-eighth day of February, in the year of our Lord one thousand eight hundred and fifty-four.

H. W. FULLER, *Clerk.*

N. B. — You shall not, except by consent of the parties in writing, permit either party to attend at the taking of the depositions, either himself, or by any attorney or agent, nor to communicate by interrogatories or suggestions with the Deponents whilst giving their depositions in answer to the interrogatories annexed to this commission. And you shall take such deposition in a place separate and apart from all other persons, and permit no person to be present during such examination, except the Deponents and yourself, and such disinterested person (if any) as you may think fit to appoint as a clerk, to assist you in reducing the depositions to writing. And you shall put the several interrogatories and cross-interrogatories to the Deponents in their order, and take the answer of the Deponents to each, fully and clearly.

[Deposition to be taken on paper of like size with this Commission.]

UNITED STATES CIRCUIT COURT, }
MASSACHUSETTS DISTRICT. }

ROSS WINANS *vs.* THE EASTERN RAILROAD COMPANY,

IN EQUITY.

Additional Interrogatories to J. H. Alexander, ——— Hazlehurst, James Murray, and Samuel J. Hayes, all of Baltimore, Maryland, on behalf of the Complainant.

1. Have you any knowledge of the use, upon any railroad, of four-wheeled cars of such proportions as are shown in the drawing annexed, marked "B. H. L."? If yea, when, where, and to what extent?

2. When were "eight-wheeled freight-cars" first used on the Baltimore and Ohio Railroad?

3. Did you know Canduce Gatch, in the service of the said railroad company? If yea, in what manner was he brought into the service of the said company, and what was his position and duty in its service?

4. Whether or not had the said Gatch, while you were connected with said company, authority to construct, or order to be constructed, cars at the expense of the said company, of other kinds or proportions than such as had been designated and approved by the officers of said company? And if yea, during what period of time, and to what extent, had he such authority?

C. P. CURTIS, JR., *Complainant's Solicitor.*

ROSS WINANS vs. EASTERN RAILROAD COMPANY.

Additional Cross-interrogatories to J. H. Alexander, ——— Hazlehurst, James Murray, and Samuel J. Hayes.

1. Will you answer the following cross-interrogatories, put in the cross-interrogatories to Oliver Cromwell, Glen, Slack, Owens, and Reynolds, and numbered therein, 1st, 2d, 3d, 4th, 5th, 6th, 17th, 18th, 26th, 27th, 28th, inclusive, in the same manner as though specifically addressed to yourself?

2. If you have known any cars for passengers, used ordinarily to run at high rates of speed, and which you suppose to have been constructed according to the mode which you consider to be in accordance with said Winans' patent, or if you have known any trucks or bearing carriages, used for freight-cars, which you consider to be in accordance with said Winans' patent, will you please state what were the ordinary rates of speed at which any such cars actually run; and do you know those rates of speed of your own knowledge; and will you name the times and places at which each of said cars or trucks were made; when, where, and by whom each of said cars or trucks were run, if run at all? And will you answer, in respect of each of said cars or trucks, the following inquiries, viz.: What was the length of the body, and mode of draft; the shape and extent of the bearing of the upper upon the under bolster, and whether there were or were not side-bearings; the construction of the trucks and truck-frames; the distance of the axles from each other in each truck; the distance of the flanges of the wheels; the saddles upon the springs; the size and shape of the springs; the degree of motion which these springs ordinarily underwent on the operations of the cars or trucks upon the road; and whether used under locomotives or cars; whether they are now in use, and how many of them; if so, where and by whom, and for what purpose; whether brakes are applied to them, and how; and at what rates of speed they are ordinarily run? Do you or not know personally whether they have ever run off the track or not, at any time; whether the truck was flexible or not, in its character of construction; whether the distance of the axles of the wheels from each

other could be changed by the mere elevation or depression of the springs; what were the shape and size of each of the different springs used in each truck; what part of either of the bolsters was between the fore and hind wheels of the truck, and whether there were not several of the lower leaves of each spring of equal length; and whether said springs were straight or curved, and how much they were deflected in the ordinary mode of loading and unloading the cars, and in running the same; and whether the bearings or boxes were outside or inside the wheels?

3. Have you ever testified in any examination, including the present one, in the case of *Winans vs. the Eastern Railroad Company*, that you have seen or known any trucks or bearing carriages, constructed in the manner set forth and described in said *Winans'* specification, to have been used on any railroad or under any locomotive? Will you now state whether the trucks so mentioned by you were or were not built by James Murray, or Murray and Hazlehurst; will you also state whether said truck had not springs in which several of the lower leaves were of the same length; were there not saddles upon the said springs; and will you answer concerning said trucks the inquiries specified in the last cross-interrogatory?

WILLIAM WHITING, *Respondents' Solicitor.*

CIRCUIT COURT, UNITED STATES, }
MASSACHUSETTS DISTRICT. }

ROSS WINANS *vs.* EASTERN RAILROAD COMPANY,

IN EQUITY.

*D. P. Rennie, Mendez Cohen, and Emil Reuter, Esquires, of Baltimore,
on behalf of the Complainant.*

1. What is your name, age, profession, your present business, and your residence?

2. Have you ever been in the service of any railroad company? If yea, what company, and during what period?

3. Are you acquainted with railroad machinery? If yea, state your means of information, and what you have had to do with it?

4. Do you understand drawings of machinery, and are you accustomed to making plans of machinery from verbal directions and written descriptions, and to what extent?

5. Have you read the specification attached to the Letters Patent issued to Ross Winans, Oct. 1st, 1834, a copy of which is annexed? If not, please read the same, and state whether or not, in your opinion, it gives such information as would enable a person skilled in

the art to which it relates, to construct a railroad car suitable for use at a speed of twenty miles per hour? If not, wherein is it deficient? (For Letters Patent, see page 3.)

6. Does or not the drawing forming a part of said Letters Patent, a copy being hereto annexed, exhibit a car having the features of construction, proportion, and arrangement, set forth in said specification? If not, specify the differences. (See Appendix.)

7. Are you acquainted with the construction of the eight-wheeled cars used on the railroads extending from the city of Baltimore, Maryland? If yea, does the said specification state the essential features of their construction, proportion, and arrangement? If not, specify the differences.

8. Do you know of the use of such freight-cars as is shown in the said drawing of said patent? If yea, state where, and when, and during what period of time, you have known such cars to be used, and how many of them.

9. Are there in use on either of said roads, trucks or bearing carriages constructed as specifically described in said specification? If yea, on which roads, and to what extent, are they used?

10. What number of eight-wheeled passenger-cars, and how many eight-wheeled freight-cars, are used on either of said roads?

11. Can you state the proportions and mode of draft of any of the eight-wheeled freight and passenger cars used on either of said roads? If yea, please do so, stating the road on which such cars are used.

12. [Objected to as irrelevant and inadmissible. W. W.]

Is there any rule in force on either of said roads regulating the construction of new eight-wheel cars? If yea, please state the proportions prescribed by such rule as to these particulars, viz.:—

First, The length of the car-body.

Second, The length of the platform out from the body.

Third, The distance of the king-bolt, or centre of the bolster, from end of body.

Fourth, The distance of the axles apart in the trucks.

Fifth, The extent of bearing between the body and truck.

Sixth, The size of the wheels used in such cars.

Seventh, Whether drawn by the body or attachment to the trucks.

If these proportions are different in the passenger-cars from those adopted for the freight-cars, please give the particular proportions adopted or prescribed for each.

13. [Objected to as inadmissible.]

What is the length of body, and the distance between the axles of the four-wheeled cars, as fixed by any rule or custom for the construction of such cars for either, and which of said roads?

14. [Objected to as supererogatory.]

What is the prescribed distance apart for the axles of the trucks intended for use under locomotives, on either of said roads?

15. Do you know of the use of such cars on either of said roads, as is shown in the drawing hereto annexed, marked "W. B."? If yea, state when, and for how long a period such car has been in use, and at what speed of travel. (See Appendix for W. B.)

16. In what essential features of construction, proportion, or arrangement, and mode of draft, do the passenger-cars now used on either of said roads differ from those shown in the said drawing, marked "W. B."?

17. Are eight-wheeled cars, called "gondola cars," used on either of said roads? If yea, on which, and to what part of such cars is the power for draft applied,—to the body or to the trucks?

18. Whether or not is there, in the possession of the said Baltimore and Ohio Railroad Company, a car corresponding to the drawing marked "W. B."? If yea, where is it, and how nearly does it resemble the said drawing?

If not, wherein does it differ?

Please examine the said car, particularly as to the features inquired of in interrogatory 12th, before making your answer.

19. If you know any other matter or thing of benefit to the parties to this suit, or either of them, please state the same fully.

C. P. CURTIS, JR., *Complainant's Solicitor.*

ROSS WINANS vs. EASTERN RAILROAD COMPANY.

Cross-interrogatories to D. P. Rennie et als.

X 1. If you have answered the 5th direct interrogatory in the affirmative, will you state whether in your reply you have referred to a person skilled in the art of car-building at the *present* time; and, if not, at what time.

X 2. If you have answered the fifth direct interrogatory in the affirmative, as relates to a railroad car suitable to be safely used at the speed of twenty miles per hour, should you make the same answer if the rate of speed had been at thirty miles per hour, or if it had been forty miles per hour? If yea, why? If not, why not?

X 3. Would it, in your judgment, make any difference in your answer to the said 5th question, whether the speed was to be at fifteen miles per hour, or fifty miles per hour? If so, why; and what difference to be required in the construction of the cars to be run at these different rates?

X 4. If you have answered the fifth direct interrogatory affirmatively, will you specify in your answer every *particular*, in which the said *specification* (without reference to the drawing) gives definite and

specific information or directions to the car-builder, as to the size, proportions, and construction of a railroad-car; and give their directions in the *language* used in the specification? And state, if you can, among other things, answers to the following questions, viz.:—What is the greatest and least *length of body allowable according to the directions in the said specification*? What is the greatest and least width of the same, so allowable? What is the greatest and least size of wheels, so allowable? What is the greatest and least distance of the *flanges* of the wheels apart, in each truck, so allowable? What is the greatest and least distance of the two trucks from each other, so allowable? What are the various modes of draft, so allowable? What is the greatest and least area, or extent of bearing, of the upper bolster upon the under bolster, so allowable? What is the greatest and least distance of the king-bolt, or centre of the bolster from the end of the body? And will you be particular in pointing out and quoting those phrases in the specification, which prescribe those limits; or that which will make it plain to a car-builder, when he has, and when he has not, adopted those proportions and that construction which is to excel, in accordance with the directions of the said specification?

X 5. If you have answered the 6th direct interrogatory affirmatively, in relation to the drawing there inquired of, will you make a critical examination thereof, and state whether it conforms in every particular to the directions of the specification, and if it shows the peculiar features of construction of the truck therein recommended and described? If not, state wherein you see any difference between the requisitions of the specification and the drawing.

X 6. If you have answered the 7th question affirmatively, will you state all the features of the eight-wheel cars therein mentioned, which you consider “essential;” and state wherein, if in any respect, the cars used on the railroads running out of Baltimore, differ from those used on the other railroads of the United States?

X 7. If you answer the 9th direct interrogatory affirmatively, will you state whether the said trucks or bearing carriages there inquired of are now in use under passenger-cars, and, if so, how many passenger-cars; and where, by whom, and how often, are said passenger-cars run; and how long have they been run or used; and what is the date at which they were built, and where were they built, and at whose establishment; and were they or not, according to the best of your knowledge and belief, built by James Murray, or by Murray and Hazlehurst?

X 8. Will you describe the bearing carriages mentioned in the said 9th direct question, in the following respects:—the size of wheels; the distance of their centres; the distance of their flanges; whether any brake or other thing is placed between them; the *size*; shape; weight of the springs; how many springs they have; how they are applied or fastened; whether more than one of the *lower leaves* of the spring are of equal length; whether there are saddles on the springs; the size, shapes, length, and other dimensions of the upper and under bolster; the size, shape, and extent of the bearings between them; whether the trucks have outside or inside bearings; whether they have any truck-frame;—and will you state every other parti-

cular of the construction of said trucks? Will you also state the extent to which the central part of said springs will admit of vertical motion when in ordinary use, by reason of their elasticity — and the number of pounds' weight which is necessary in order to give them that degree of motion; and whether these springs are semi-elliptical or straight, or how otherwise shaped; and to what extent their motion, in a vertical direction, will increase or diminish the distance between the flanges of the wheels, when in motion; and how long it is since trucks of precisely the same description as inquired of have been built and put in use on said road? (*De bene esse.*)

X 9. If you answer the 12th interrogatory, will you state whether you know of your own knowledge the facts stated by you in answer to this question; or have you obtained your knowledge from information derived from others?

X 10. If you have answered the 18th question, will you state whether you have measured the different parts and proportions of the said Washington car; and have you measured accurately the said drawing according to the scale thereof; and have you made each of your statements from exact measurements? If not, will you please to re-examine said car and said drawing; and answer the same inquiries from exact measure newly made by yourself.

X 11. Do not the most recently built cars for passengers, upon the roads running out of Baltimore, now have rigid wheel-frames, side bearings; and are they not the same as those in common use on the northern roads? If not, wherein do they differ?

X 12. To what trade, business, or occupation, did you belong when you were twenty-one years of age; when and with whom did you serve your time; where have you resided at and since that time; what have been your pursuits as a business-man up to the present time; are you a native of this country? If not, when did you come to Maryland, or have you always resided there?

X 13. Have you ever been personally or practically engaged in building railroad cars, or locomotives; if so, when, where, and for how long; or have you ever yourself made any working plans of any eight-wheel cars? If yea, when, where, and for whom were they made; and, if made, were any cars built according thereto? If yea, where, when, and by whom were such cars built; and will you give a full and complete description of said cars?

X 14. Have you ever seen, heard, or read, or heard read or stated, or obtained knowledge of the substance of any of the direct or cross-interrogatories which you have answered in this case, or of all of them? If yea, will you state where and when you obtained such knowledge; who communicated it to you, or permitted you to learn, hear, see, read, hear read or stated, the substance of said, or of any of said interrogatories, at any time before giving your deposition before the Commissioner; and whether you have conversed with Charles D. Gould or Ross Winans, or their Counsel, before giving your testimony? Have you heard, read, or obtained knowledge of any of the testimony or opinions given by other persons upon any of the questions put to you, or of any of the affidavits, or what purported to be

copies of affidavits, given in any of said Winans' cases, relating to the patent hereinbefore mentioned?

X 15. Are you acquainted with any of the witnesses who have been examined before Commissioners, or otherwise, in Ross Winans' cases? If so, which of them have ever been, or are now connected in business with him, or with either of his sons, or have been employed by him or them; and in what capacity?

X 16. Do you know any matter or thing whatever, which will, in your opinion, be of benefit to the Respondents in this case? If so, will you please to state the same fully and particularly?

WILLIAM WHITING, *Solicitor for Respondents.*

Deposition of D. P. Rennie.

DAVID P. RENNIE being produced this tenth day of March, A. D. 1854, as a witness on behalf of the Plaintiff, and being carefully cautioned and sworn to tell the whole truth and nothing but the truth, deposes, in answer to the interrogatories exhibited to him on behalf of said Plaintiff, as follows:—

1. To the first interrogatory. My name is David P. Rennie. I am thirty-nine years of age; by profession a Civil and Mechanical Engineer. My present business is superintending the construction and repairs of machinery on the Baltimore and Ohio Railroad, as Assistant Master of machinery. I reside in Baltimore.

2. To the second interrogatory. I have been in the employ of the Baltimore and Ohio Railroad Company since the 19th of July, 1843, to the present time.

3. To the third interrogatory. I am acquainted with railroad machinery; my information of the same was obtained from written and verbal instruction, also from my own personal observation. I have made general plans, detail or working drawings, and specifications for machinery.

4. To the fourth interrogatory. I have been accustomed to make plans of machinery from verbal directions and written descriptions. It was my daily occupation for five years.

5. To the fifth interrogatory. I have read the specification attached to the Letters Patent issued to Ross Winans, Oct. 1, 1834. It gives such specific information as would enable a person skilled in the art to which it relates, to construct a railroad car suitable for a speed of twenty miles per hour.

6. To the sixth interrogatory. The drawing shows a car having the essential features set forth in the written specification, except a truck-frame with a spring to each wheel, instead of a single spring, connecting a pair of wheels and a bolster, as described; which differ-

ence is not deemed important, and may be made without altering the invention of the Patentée; and is a kind of bearing carriage which the Patentee suggests may be used, although he prefers the mode described.

7. To the seventh interrogatory. I am acquainted with the eight-wheeled cars used on the railroads extending from the city of Baltimore, Maryland. The said specification states the essential features of their mode of construction, proportion, and arrangement.

8. To the eighth interrogatory. The cars, as shown in the said drawing of said patent, are used for the transportation of freight or general merchandise. I have seen them in use on the Baltimore and Ohio Railroad during the last fifteen years.

9. To the ninth interrogatory. There are bearing carriages or trucks constructed as specifically described in the said specification; they are in use on the different railroads extending out of Baltimore.

10. To the tenth interrogatory. On the Baltimore and Ohio Railroad (of which I have a more extended knowledge, from my connection with it), there are 127 eight-wheeled passenger-cars, and 2,200 eight-wheeled freight-cars.

11. To the eleventh interrogatory. I can state the proportions and mode of draft, for the freight and passenger-cars used on the Baltimore and Ohio Railroad.

12. To the twelfth interrogatory. There is a rule or custom in force on the Baltimore and Ohio Railroad, for the construction of new eight-wheeled cars; the proportions best adapted to the peculiarities of said road for freight-cars are as follows:—

Length of body, twenty-four feet.

Length of platform beyond body, twenty inches.

Distance of king-bolt from end of body, three and a half feet.

Distance of axles apart in trucks, forty inches.

Extent of side-bearings, thirty-six inches across axis.

Diameter of wheels, thirty-one inches.

Drawn by body in all cases.

Run at a speed of from twelve to twenty miles per hour.

The proportions of passenger-cars on said road are somewhat modified from the best proportions; for particular reasons, those adopted are as follows:—

Length of body, thirty-five and a half feet.

Length of platform beyond body, thirty inches.

Distance of king-bolt from end of body, four and a half feet.

Distance of axles apart, fifty inches.

This distance is increased beyond the desired or best proportion, on account of the use of a swing-beam, which is used to give greater ease to the load while in motion at high speed.

Extent of bearing between body and truck, thirty-nine inches.

Size of wheels, thirty-one inches diameter.

Drawn by body in all cases.

At a regular speed at from thirty to forty miles per hour.

13. To the thirteenth interrogatory. The rule or custom governing the length of body, and the distance between the axles for the four-wheeled cars, differed in accordance with the lateral curvature of the track-rails, and the circumstances of the road for which they were constructed.

For those constructed for the Baltimore and Ohio Railroad, the length of body was usually twelve feet. Distance of axles apart, five and a half feet.

14. To the fourteenth interrogatory. There is no prescribed distance apart for the axles of the trucks used under locomotive engines. It is, however, desirable on roads of much lateral curvature of rail, to place the flanges of the wheels as close together as practicable, which custom is observed on the Baltimore and Ohio Railroad. On said road said distance ranges from thirty-four to forty inches apart for wheels thirty inches diameter.

15. To the fifteenth interrogatory. I do know the use of such car, marked "W. B." It was built in the shops of the Baltimore and Ohio Railroad Company, and was used on the "Washington Branch Road" for twelve years as a passenger-car, at a regular speed of from twenty-five to thirty miles per hour.

16. To the sixteenth interrogatory. The passenger-cars now in use do not differ in any essential particulars of construction, proportion, and arrangement, or mode of draft, from the cars shown in the drawings, marked "W. B."

17. To the seventeenth interrogatory. "Gondola cars" are in use on the Baltimore and Ohio Railroad, the power of draft being applied to the body in all cases.

18. To the eighteenth interrogatory. There is such a car at Mount Clare station, which is fairly, and, I judge, accurately represented by the side-view of the drawing marked "W. B."

19. To the nineteenth interrogatory. I do not know any thing further of benefit to any of the parties to this suit, or either of them.

To the cross-interrogatories exhibited on the part of Defendants, he deposes as follows:—

X 1. To the first cross-interrogatory. In my answer to the 5th direct interrogatory, I referred to persons skilled in the art of car-building, at any period of time since the introduction of car-building for railroad purposes.

X 2. To the second cross-interrogatory. Yes. A railroad-car constructed to be safely run at a speed of twenty miles per hour, would be equally safe to run at a speed of thirty or forty miles per hour.

X 3. To the third cross-interrogatory. No. A railroad-car constructed for a speed of fifteen miles per hour, could be made equally safe for a speed of fifty miles per hour, by so fashioning and combining the different parts with additional strength.

X 4. To the fourth cross-interrogatory. I do not regard the specification as addressed to a person who is merely skilled in the use of tools or in the manipulation of the fitting up of different parts of a

railroad car, but to the railroad engineer, whose business it is to proportion and arrange cars, adapted to the peculiarities of a railroad. The said specification gives the construction of the several parts of an eight-wheel car, and defines the size and position of each part, and their relative position to each other; so that a skilful car-builder, knowing the peculiar features of the road that the car is intended for, can make a car suitable for the same.

The entire directions set forth in the specification must be taken for a guide, as a part would not convey the whole information; for the construction, proportion, and arrangement of the car, intended by the Patentee, he clearly indicates the following: i. e. —

The body to be twice the length of the four-wheeled car.

The width of body to be as wide as the features of the road will admit of.

Size of wheels found best adapted to the road, and the purpose the car is intended for.

The greatest distance apart being somewhat less than that shown by the said four-wheeled cars. The least distance being that in which the flanges just clear each other.

The greatest distance is beyond the end of the car-body. The least distance is that which will give the advantages claimed by the arrangement specified, the more remote the better.

That which will give free action to the bearing carriages on the track; which confines the attachment of draft either to the body, top-bolster, or king-bolt.

The greatest extent of bearing for the bolsters would be their entire length, and the least would depend on the extent of curvature and the elevation of the outer track-rail.

The distance of king-bolt depends upon the position of the truck under the body, as stated above.

The specification is for the alteration of the car in use, to effect safety, speed, and stability of car. A specific direction is given in it for a construction of each part, to fit it to its use; and, as this differs on different roads, the roads themselves govern the proportions. The whole scope of the specification is to be considered; and extracts from it, separate from the rest, would not convey the meaning of the Patentee.

There are reasons often which prevent the use of the best form and position of some of the parts, as in the use of the *swing-beam*, in the trucks, which give ease, and at the same time prevent the best form of truck for the features of the Baltimore and Ohio Railroad; and as the advantage of the distance of trucks for ease to the load is in proportion to their remoteness, so, if the strength of rail will admit of it, a longer than the most safe length of body is often used in the passenger-cars.

X 5. To the fifth cross-interrogatory. I have examined the drawing,

(of patent, see letter "A."), and regard it as fairly showing the car set forth in the specification, showing a long body resting near the ends upon the bearing carriages, which have a spring to each wheel, and the axles placed near together, as compared with their place in a four-wheeled car, with a body one-half the length of that shown, and mode of attaching draft as indicated in the specification. With reference to the trucks, I have stated in an answer to a direct interrogatory.

X 6. To the sixth cross-interrogatory. The essentials of an eight-wheeled car, in my opinion, are a long body resting at its ends on trucks of four wheels each, having their axles brought near together, with springs to the axles to relieve shocks to the wheels, and so support the body as to allow freedom of motion between body and trucks when rapidly passing over lateral curvatures, with such mode of draft as will allow free motion between the body and trucks when running on the road.

X 7. To the seventh cross-interrogatory. Such trucks are not now used under passenger-cars, but are used under freight-cars, locomotive engines, and engine-tenders, and have been so used during the entire period of my connection with said company. Such trucks have been made and put in use during the present year, 1854. Such trucks have been furnished by Messrs. Norris and Son, of Philadelphia; by Ross Winans, and were built in the said company's shops.

I know that those on the Baltimore and Ohio Railroad were not furnished by Messrs. Murray and Hazlehurst.

X 8. To the eighth cross-interrogatory. I will do so for those on the Baltimore and Ohio Railroad.

Size of wheels vary from twenty-eight to thirty-one inches diameter.

Distance of axles apart from thirty-four to forty inches.

Brakes are in some instances placed between the wheels, and sometimes outside.

The spring is slightly curved, by four inches in width, varying from five to seven inches in depth, and varying from forty-eight to fifty-four inches in length, in weight from 225 to 240 pounds. They are fastened to the top of the journal-boxes by bolts, and to the ends of the bolsters by bolts and straps. Some have saddles, and others not. The bolsters extend from one spring to the other, and are nearly straight, of different dimensions.

The extent of bearing between bolsters varies from ten to thirty-nine inches, and have both outside and inside bearings. Some have truck frames.

The vertical motion will vary from one to two inches. I cannot state what weight is required to give such degree of motion.

The springs are slightly curved. Their extreme vertical motion will vary the distance between the axles less than one inch.

Such trucks have been built and put in use every year during my connection with said road.

X 9. To the ninth cross-interrogatory. I know the facts stated in my answer to the 12th direct interrogatory, of my own knowledge.

X 10. To the tenth cross-interrogatory. I have not made any measurements of the car.

X 11. To the eleventh cross-interrogatory. The cars for passengers on the railroads leading out of Baltimore have rigid wheel-frames and side-bearings. I am not acquainted with the construction of those in common use on the Northern roads.

X 12. To the twelfth cross-interrogatory. When I was 21 years of age, my business was that of civil engineer. I have resided since and at that time in Baltimore, Maryland. My pursuits as a business-man to the present time is that of a civil and mechanical engineer. I am not a native of this country; I came to Maryland in 1834.

X 13. To the thirteenth cross-interrogatory. I made working plans of eight-wheeled cars in the year eighteen hundred and forty-seven, in the office of the master of machinery of the Baltimore and Ohio Railroad Company. Cars were built according to them, by the Messrs. Denmeads of Baltimore, and in the shops of said company. My memory does not serve me now, nor have I the material at hand to give a full and complete description of said cars.

X 14. To the fourteenth cross-interrogatory. I have not.

X 15. To the fifteenth cross-interrogatory. I am not acquainted with any.

X 16. To the sixteenth cross-interrogatory. I do not.

D. P. RENNIE.

Deposition of Emil Reuter.

EMIL REUTER, being produced this 15th day of March, A.D. 1854, as a witness on behalf of the Plaintiff in this cause, and being carefully cautioned, and sworn to tell the whole truth, and nothing but the truth, deposeth, in answer to the interrogatories exhibited to him, on behalf of said Plaintiff as follows:—

1. To the first interrogatory. My name is Emil Reuter. I am thirty-two years of age; and am a civil and mechanical engineer. I reside in the city of Baltimore.

2. To the second interrogatory. I have been in the service of the Royal Bavarian Railroad Company, at Nuremburg, in Germany, from 1843 to 1845; and in that of the Reading Company of Pennsylvania, from 1847 to 1850; and in that of the Baltimore and Ohio Railroad Company during the year eighteen hundred and fifty-three.

3. To the third interrogatory. I am acquainted with railroad machinery, practically and theoretically. My education was completed at the Polytechnic School in Bavaria.

4. To the fourth interrogatory. I have been engaged in planning, drawing, and constructing such machinery; and it is part of my pre-

sent business to plan, perfect, and adapt machinery for the public from such descriptions.

5. To the fifth interrogatory. I have carefully read the said specification, and believe it gives all the information required to enable such persons to build an eight-wheeled railroad car, to be used with safety at a speed of twenty miles an hour.

6. To the sixth interrogatory. I believe the car exhibited in said drawing does fairly show a car having the features of construction, proportion, and arrangement, claimed in said specification.

7. To the seventh interrogatory. I am acquainted with the cars used on said roads, and believe that the said specification states the essential features of the construction, proportion, and arrangement of the eight-wheeled cars so used on them.

8. To the eighth interrogatory. I know of the use of such cars, with unimportant alterations, in large numbers, on the road extending from said city of Baltimore, during the three years I have lived here.

9. To the ninth interrogatory. I have seen such spring-trucks under eight-wheeled cars and locomotive tenders, which were and are in use on the Baltimore and Ohio Railroad, and on the Baltimore and Susquehannah Railroad, and under passenger locomotive engines on the Baltimore, Wilmington, and Philadelphia Railroad, and for particulars refer to the annexed statement marked "*Emil Reuter, No. 1.*"

10. To the tenth interrogatory. I do not know.

11. To the eleventh interrogatory. I can state some of the proportions of some of the cars and locomotive engines belonging to and used on said railroads, which were obtained by me by my own measurement, made within a few days, at the request of C. D. Gould, Esq.

The cars and engines measured were not selected; but all the cars and engines found at the three different stations, standing in a group, with all the truck-engines at the Baltimore and Ohio Railroad station, are included in the statement referred to in my preceding answer, marked "*Emil Reuter, No. 1.*" (pp. 118, 119, 120.)

12. To the twelfth interrogatory. I do not know if there are any such rules; and also refer to my statement, marked "*Emil Reuter, No. 1.*"

13. To the thirteenth interrogatory. I refer to my last two answers.

14. To the fourteenth interrogatory. I refer to my answers to the 11th and 12th interrogatory.

15. To the fifteenth interrogatory. I have seen at the Mount Clare Station of the Baltimore and Ohio Railroad a car which is like the drawing hereto annexed, marked W. B. It appears to have been originally a passenger-car, and subsequently to have been used as a baggage-car. That part of the drawing showing the running gear separate from the body is incorrect in the following particulars:—The width of track is indicated at five feet four inches, which should be four feet eight and a half inches. The wheels are shown to be thirty inches in diameter; they should be thirty-one inches. The distance

of the axles apart is two feet nine inches; it should be three feet one inch. The drawing is correct in other particulars.

16. To the sixteenth interrogatory. I do not see any difference in what I consider the essential features of an eight-wheeled passenger car, when compared with those which I see in daily use on the Baltimore and Ohio Railroad. The length of body and its bearing on the trucks, the nearness of the axles in each truck, the wide separation of the trucks, the application of a spring to each wheel, and the mode of draft, and allowing the trucks to vibrate freely, are essentially the same as those I see in constant use.

There are variations in minor points, such as the arrangement of the springs which give greater ease to the load, the framing by which the shape of the body is preserved. The roof of the old car does not project over the platform, nor has it spring-bumpers to draw by. It has iron bolsters, and there is more of iron and less of wood in the trucks than in the cars of recent construction.

17. To the seventeenth interrogatory. I have seen in use on the Baltimore and Ohio Railroad, eight-wheel gondola cars, which were in all instances drawn by an attachment of the power to the end of the body.

18. To the eighteenth interrogatory. I refer to my answer to the 15th direct interrogatory.

19. To the nineteenth interrogatory. I do not know any other matter or thing of benefit to the parties to this suit, or either of them.

To the *Cross-interrogatories* exhibited to him, on the part of Defendant, he deposes as follows:—

X 1. To the first cross-interrogatory. I think a person qualified to construct a car such as in use at the date of said patent, or since, would be enabled to construct the improved car; for it consists of a better adaptation of the features of the other, with such specified additions as give the favorable effect of each, and of the whole combined, for the special object stated in said patent.

X 2. To the second cross-interrogatory. If the improved car was safe, from the principles involved in it, there would be safety in its use at either twenty, thirty, or forty miles per hour.

X 3. To the third cross-interrogatory. For a car to be used at high speed, I should not make any difference in its principles, but should take more care to select proper materials to be used in it, and that the work done on them should be better executed.

X 4. To the fourth cross-interrogatory. In using the said specification as a guide to construct the improved car, reference must be made not only to the difficulties arising out of imperfections of the road, the extent of curvatures, weight of rail used, and speed of travel, which governed the proportions of four-wheeled cars and limited their speed on American roads to fifteen miles per hour, but to those also through which a car adapted to one road was thereby rendered unsuited to another.

To illustrate this, it may be stated that four-wheeled cars made and used for the same purpose, but adapted to roads having curvatures of different lengths of radius and different strengths of rail, vary in length of body from ten to twenty feet, and in capacity from two to five tons weight per wheel, with relative variations of other proportions.

It may be then assumed, as stated in said specification, that the four-wheeled cars in use at its date of issue were adapted in capacity and in proportions to the road on which each was used, and also to a moderate speed of travel. But the improved construction of roads, and new features of high speed and stronger rails (giving enlarged capacity of car-body at the sacrifice of stability), having added to the difficulties arising from the curvatures, a modification of the four-wheeled cars became necessary.

The Patentee, to make his mode of construction and arrangement plain, and adapt it to roads of different proportions, refers to the existing four-wheeled cars as a standard known to all, and points out the difficulties which attend their use; then shows that several of their features and proportions are not the best suited to their special purpose, but were so applied from the force of other considerations, which could not be disregarded in a car of that construction, adapted to that road. He then proposes to obviate some of these difficulties by a new arrangement of this four-wheeled car, and points out upon it such alterations in its proportions and construction of each part, as will best effect the purpose of using it in a new relation, merely stating that the body of the projected car be twice the length of that of the four-wheeled car-body, and be supported near its ends on centres of trucks, having springs to the wheels, and the axles of the trucks placed nearer than in said four-wheeled cars; that the trucks shall be placed remote from each other, and be so connected with the body as to permit the former to move easily under the latter; the whole to be so used as to give each feature the advantage due to the new proportions and arrangement, with reference to the object in view.

Owing to the particulars I have stated, the Patentee, to my mind, has done better than to have given a long list of definite proportions in feet and inches; for each railroad requires a car adapted to its weight of rail and curvatures. The said specification gives the rationale of an improved car, with precise instructions as to the alterations to be made in the parts and proportions of the four-wheeled car in use, to adapt it to the various features of its road. The whole specification may be referred to with advantage, in constructing a car; and I would not leave out any part of it when using it as a guide for the construction of a car under said patent, for each instruction is governed by the rest of it.

X 5. To the fifth cross-interrogatory. Upon a critical examination of said drawing, I do not discover any essential differences between the truck shown on it, and that fully described in said specification.

The specification fully describes a spring truck, as prepared by the patentee, in which the two springs form the only connection between the wheels and the bolster, but others may be used.

X 6. To the sixth cross-interrogatory. I consider as essential, in an eight-wheeled car under said specification,— *First*, A long body to be supported near its ends. *Second*, In placing the trucks far apart. *Third*, To have the truck-axles near together. *Fourth*, Draft by such mode as gives the full benefit of the construction and arrangement. *Fifth*, A bearing of the weight of the body so as to allow the trucks to vibrate freely under the body, and be safe at high speed. *Sixth*, The effect of a spring to each wheel. Within my observation, the eight-wheeled railroad cars, in general use, are alike in these particulars, having more or less perfect adaptation to the road on which they run.

X 7. To the seventh cross-interrogatory. I have not seen passenger-cars having such trucks.

X 8. To the eighth cross-interrogatory. The size of the wheels in the spring-trucks I have examined, were twenty-eight, thirty-one, and thirty-three inches in diameter. There were brakes between some of the wheels used on the freight-cars. There were no brakes under those in the engines. The springs varied from four to six inches in depth. The shape was nearly straight, having but little *set*; the thickness of plates varied from a quarter to half an inch. The springs used were fastened by bolts and sockets on the journal-boxes, and by straps and bolts to the bolster. I have seen such trucks in large numbers under engines and tenders, which I know to have been placed on the Baltimore and Ohio Railroad, and the Baltimore, Wilmington, and Philadelphia Railroad, during the last and present year.

X 9. To the ninth cross-interrogatory. I refer to my answer to the 12th direct interrogatory.

X 10. To the tenth cross-interrogatory. I have measured the said car, marked "W. B.", and find that its construction and proportions are accurately shown in said drawing, except as to the points noticed in answer to the 15th direct interrogatory.

X 11. To the eleventh cross-interrogatory. The cars recently built for passengers upon the roads running out of Baltimore, have trucks similar to those in common use on the Northern roads, as far as my knowledge extends.

X 12. To the twelfth cross-interrogatory. At twenty-one years of age, I was foreman of the machinery establishment conducted by George Henschel and Son, at Hesse Cassel, in Germany. I am a native of Bavaria, and have been in this State nearly three years.

X 13. To the thirteenth cross-interrogatory. I have been so engaged and connected with railroad companies in Europe and this country. I have constructed cars in all essential particulars like the car shown in the drawing attached, except that wooden bolsters were used instead of iron.

X 14. To the fourteenth cross-interrogatory. I have not.

X 15. To the fifteenth cross-interrogatory. I have no knowledge.

X 16. To the sixteenth cross-interrogatory. I do not know of any thing.

EMIL REUTER.

I, John Hanan, Commissioner named in the annexed commission, do hereby certify, that I did take the depositions of David P. Rennie and Emil Reuter, in answer to the interrogatories propounded to them; and that each of said witnesses were by me first carefully examined, and duly cautioned and sworn, according to law; that they were respectively examined by me, separate and apart from all other persons, and from each other; and that the interrogatories and cross-interrogatories were propounded to them in their order; and their respective examinations, as hereinbefore set forth, were reduced to writing by me, and thereafter subscribed by said witnesses respectively in my presence. I do further certify that I am not of counsel or attorney for either of the parties to the said cause, and that I am not interested in the event of said cause.

Given under my hand and seal, this fifteenth day of March, in the year of our Lord one thousand eight hundred and fifty-four.

[L. s.]

JOHN HANAN, *Commissioner*.

EMIL REUTER, No. 1.

[Filed, J. HANAN, *Comm.*]

Different Lots of Cars measured at the Baltimore Station of the Philadelphia, Wilmington, and Baltimore Railroad.— (Width of Track, 4ft. 8½in.)

KIND OF CARS.	Length of Body.		Length of Platform.		Distance of Centre-pin of Bolster to end of Body.		Distance between Truck-axes.		Diameter of Truck-wheels.		REMARKS.
	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	
1 Passenger Car . . .	29	9	2	5	2	9	3	8	2	9	} Width of Cars, 8ft. 4in.
1 Passenger Car . . .	40	3	2	6	4	6	4	½	2	9	
1 Passenger Car . . .	49	4	2	6	4	6	4	1½	2	9	
2 Passenger Cars . . .	49	4½	2	6	4	5	3	8	2	9	
2 Passenger Cars . . .	41	6	2	7	4	6	4	2	2	9	
1 Package Car . . .	32	2	2	4	4	2	3	9	2	9	} Width Platform, 5ft. 1in.
1 Package Car . . .	39	9	2	8	4	3	4	2	2	7	
1 Package Car . . .	28		2	2	4	2½	3	6½	2	9	
2 Horse Cars . . .	11	1	1				5	10½	2	9	Four-wheel Car.
1 Freight Car . . .	19	9					8	11	2	9	Six-wheel Car.
2 Trucks . . .	8						3	5	2	9	Four-wheel Car.
3 Freight Cars . . .	37	9	2	3	5	1½	3	7½	2	9	
4 Freight Cars . . .	28		1	6	4	5	3	6	2	9	
1 Gondola . . .	26	5	1	9	4	7	3	5	2	9	

Different Lots of Cars measured at Mount Clare Station, Baltimore and Ohio Railroad, Baltimore, Md. — (Width of Track, 4ft. 8½in.)

KIND OF CARS.	Length of Body.		Length of Platform.		Distance of Centre-pin of Bolster to end of Body.		Distance between Truck-axes.		Diameter of Truck-wheels.		REMARKS.
	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	
6 Passenger Cars . . .	35	8	2	6	4	8	4	3	2	7	} Width Platform, 3ft. 6in.
4 Passenger Cars . . .	25	2	1	8	4	1	3	4	2	7	
1 Passenger Car . . .	34	7	2	5	4	2	4	3	2	7	
1 Passenger Car . . .	35	8	2	6	4	7	4	2	2	7	
1 Passenger Car . . .	34	3	2	5	4	2	3	5	2	7	
1 Pay-off Car . . .	10	6	2	3	1	3	3	1	2	7	
2 Express Cars . . .	11	1	1	7	1	10	3		2	7	} Four-wheel Cars. Four-wheel Cars. Four-wheel Car.
2 Freight Cars . . .	30		1	7	4	1	3	5	2	7	
2 Freight Cars . . .	9	11					4	2	2	7	
2 Freight Cars . . .	9	10					4	2	2	7	
1 Freight Car . . .	9						3	3	2	7	
1 Express Car . . .	11	1	1	9	1	5	3	1	2	7	
2 Freight Cars . . .	26		1	8	4		3	5	2	7	
4 Freight Cars . . .	25	2	1	8	4	1	3	5	2	7	
1 Freight Car . . .	32	4	2	8	4	3	3	4	2	7	
1 Freight Car . . .	34	8	2	7	4	4	3	4	2	7	
1 Freight Car . . .	32		2	7	4		3	4	2	7	
1 Freight Car . . .	25	2	1	8	3	7	3	5	2	7	
1 Freight Car . . .	22	1	1	5	3	7	3	5	2	7	
1 Freight Car . . .	24	2	1	6	3	9	3	4	2	7	
1 Freight Car . . .	40		1	7	4	1	3	8	2	7	
1 Freight Car . . .	24	2	1	7	4	1	3	5	2	7	Spring Truck.

Cars measured at the Susquehannah Railroad Depot (at Calvert-street Station), Baltimore, Md.

KIND OF CARS.	Length of Body.		Length of Platform.		Distance of Centre-pin of Bolster to end of Body.		Distance between Truck-axes.		Diameter of Truck-wheels.		REMARKS.
	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	
Mail	34	8	2	8	4	8	4	4	2	9	Width Platform, 3ft. lin.
Passenger	40		2	8	5	2	4	5	2	9	
Passenger	40	1	2	8	5	1	4	5	2	9	
Passenger	33	6	2	8	5		4	6	2	9	
Passenger	40	2	2	8	5		4	7	2	9	
Passenger	40	3	2	8	5	2	4	5	2	9	
Passenger	40	3	2	8	5	2	4	4	2	9	
Passenger	40	3	2	8	5	2	4	4	2	9	
Passenger	40	2	2	8	5	1	4	4	2	9	
Passenger	40	3	2	6	5	2	3	4	2	9	
Passenger	40	2	2	6	5	2	4	4	2	9	
Freight	26	3	2	2	4	6	3	4	2	9	Dist. of outer Axles, 9ft. 4in.
Freight	26	3	2	2	4	10	3	7	2	9	
Freight	26	3	2	1	4	9	3	5	2	9	
Freight	25	3	1	11	4	7	3	7	2	9	
Freight	29	9	1	6	4	6	4		2	9	
Freight	26		2	2	4	6	3	5	2	9	
Freight	23	3	2		4	7	3	7	2	9	
Freight	23	3	1	11	4	8	3	8	2	9	
Freight	23		2	1	4	6	3	5	2	9	
Six-wheel Freight . . .	17	4					9	4	2	9	
Four-wheel Freight . .	11	8			4	7	4	9½	2	9	Without Trucks. 9ft. bet. outer axles.
Four-wheel Freight . .	11	6			4	2	6		2	9	
Four-wheel Freight . .	10	4			4	7	4	10	2	9	
Freight	25	3	2		4	10	3	7	2	9	
Freight	26		2		4	10	3	4½	2	9	
Six-wheel Freight . . .	17	3					9		2	9	
Freight	26	1	2	1	4	10	3	5	2	9	
Freight	25	3	1	11	4	10	3	7	2	9	
Freight	25	3	1	11	4	7	3	7	2	9	
Freight	25	2	1	11	4	8	3	7	2	9	
Freight	26	1	1	10	4	9	3	7	2	9	
Freight	27		2	1	4	7	3	4	2	9	
Freight	27		2	1	4	7	3	4	2	9	
Four-wheel Freight . .	11	3	1	10	4	3	5	2	2	9	
Freight	23	11	2	1	4	9	3	7	2	9	
Freight	26	1	1	11	4	10	3	4	2	9	
Freight	25	11	1	11	4	10	3	7	2	9	
Freight	27		2	1	4	6	3	4	2	9	
Freight	27		2	1	4	7	3	4	2	9	
Freight	27		2	1	4	7	3	4	2	9	
Four-wheel Freight . .	11	6					4	10	2	9	
Four-wheel Freight . .	10	8					4	9	2	9	
Truck							3	6	2	9	
Truck							3	6	2	9	
Truck							3	6	2	9	
Truck							3	6	2	9	

*Measurements of several Locomotives of the Baltimore and Ohio Railroad,
and the Baltimore and Susquehannah Railroad Company.*

NAMES AND NUMBER OF WHEELS OF LOCOMOTIVE ENGINES.	Distance between Axles of Drivers.		Distance between Truck-axles.		Diameter of Truck-wheels.		REMARKS.
	ft.	in.	ft.	in.	ft.	in.	
BALTIMORE . . . 8w.	6		3	2	2	7	} Baltimore and Susquehannah Railroad, Boston Depot.
YORK 8w.	6		3	7	3	2	
. . . 8w.	7		3	8	3	2	
No. 27 8w.	4	7	2	11	2	7	} Baltimore and Ohio Railroad, Mount Clare Depot.
No. 24 6w.			3	2	2	7	
No. 20 6w.			3	1	2	7	
No. 31 8w.	5	4	3	4	2	6	
No. 30 8w.	5	9	3	5	2	6	
No. 23 8w.	5	9	2	11	2	6	
Average . . .			3	3			
BRANDYWINE . 8w.	.	.	3	1	2	6	} All with Spring-trucks and no Frame. Philadelphia, Wilmington, and Bal- timore Railroad, Wilmington Depot.
UNION 8w.	.	.	3	$\frac{1}{2}$	2	6	
WASHINGTON . 8w.	.	.	3	1	2	4	
MINERVA . . . 8w.	.	.	3	$\frac{1}{2}$	2	6	
MISSISSIPPI . . 8w.	.	.	3	$1\frac{1}{2}$	2	6	
UNITED STATES 8w.	.	.	3	$1\frac{1}{2}$	2	6	
DELAWARE . . . 8w.	.	.	3		2	6	
CINCINNATI . . 8w.	.	.	3	$1\frac{1}{2}$	2	6	
SUSQUEHANNAH 6w.	.	.	3	2	2	6	
Average . . .			3	1	2	5	

Eighteen Tenders, with four-wheel spring-trucks three feet ten between axles.

These Locomotives and Tenders each had a truck under one end, and were made just as is described in the specification of Mr. Winans' said patent.

UNITED STATES OF AMERICA.

[L. s.]

THE CIRCUIT COURT OF THE UNITED STATES, WITHIN AND FOR THE MASSACHUSETTS
DISTRICT

MASSACHUSETTS DISTRICT, ss.

To John Hanan, of Baltimore, in the District of Maryland, Esquire, United States Commissioner; or Levin Gale, of said Baltimore, Esquire, United States Commissioner; or John Carrere, of said Baltimore, Esquire, United States Commissioner.

Know ye, that reposing confidence in your wisdom, prudence, and fidelity, we have appointed, and by these presents do authorize and empower, you to take the answers to the interrogatories hereunto annexed, of J. H. Alexander, ——— Hazlehurst, James Murray, and Samuel J. Hayes, of Baltimore, in the State of Maryland, witnesses to be examined on behalf of the Complainant, and to be used in a certain cause now pending in said Court, wherein Ross Winans is Plaintiff, *vs.* The Eastern Railroad Company, Defendants, in equity.

And to this end, at certain days to be by you appointed for that purpose, to cause said witnesses, as aforesaid, to be brought before you, and each witness, while present before you, to examine carefully on oath touching the premises. And, when you shall have taken the examination as aforesaid, to reduce or cause the same to be reduced to writing, and to be subscribed by each of said witnesses in your presence. And the same, so taken and subscribed, to return, together with this Commission and your doings herein, enclosed, sealed, and directed to the Circuit Court aforesaid, holden at Boston, as soon as the same may be executed.

In testimony whereof, we have caused the seal of the said Circuit Court to be hereunto affixed.

Witness, the Honorable Roger B. Taney, at Boston, this tenth day of February, in the year of our Lord one thousand eight hundred and fifty-four.

H. W. FULLER, *Clerk.*

N. B. — You shall not, except by consent of the parties in writing, permit either party to attend at the taking of the depositions, either himself, or by any attorney or agent, nor to communicate by interrogatories or suggestions with the Deponents whilst giving their depositions in answer to the interrogatories annexed to this commission. And you shall take such deposition in a place separate and apart from all other persons, and permit no person to be present during such examination, except the Deponents and yourself, and such disinterested person (if any) as you may think fit to appoint as a clerk, to assist you in reducing the depositions to writing. And you shall put the several interrogatories and cross-interrogatories to the Deponents in their order, and take the answer of the Deponents to each, fully and clearly.

[Depositions to be taken on paper of like size with this Commission.]

UNITED STATES CIRCUIT COURT, }
 MASSACHUSETTS DISTRICT. — May Term, 1853. }

ROSS WINANS vs. THE EASTERN RAILROAD COMPANY,

IN EQUITY.

Interrogatories to be proposed to J. H. Alexander, ——— Hazlehurst, James Murray, and Samuel J. Hayes, of Baltimore, in the State of Maryland, witnesses on behalf of the Complainant.

1. What is your name, age, place of residence, and profession or occupation; in what service have you been engaged, and where; how long have you been engaged in your said profession, and what experience have you had in the study and practice of mechanical science, and where?

2. Do you know the Complainant, Ross Winans? and, if yea, please state where and in what years you so knew him, and in what railroad service or capacity he was employed?

3. Whether or not have you testified as an *expert* in patent cases in courts of justice? If yea, how often, and in what classes of subjects?

4. If you shall have stated that you are a civil engineer, superintendent, or other officer, or contractor for machinery, of any railroad, or at any time have been; whether or not has it been part of your duty or business to attend the construction and management of the running gear of railroad cars? and, if yea, to what extent?

5. Please state what degree of advancement civil engineering had made in this country, and what degree of experience American engineers generally were possessed of in 1829 and 1830, or when the B. & O. Railroad was commenced; what other railroads were then in operation in this country, if any, and what measures were taken by the engineers of the said railroad company to acquire information respecting the subject of railroads?

6. When, where, and under what circumstances did you first have knowledge of an organized eight-wheeled railroad car? Please state fully all you know and recollect relative to it.

7. Whether or not are you acquainted with the general construction of the trucks of eight-wheel passenger and freight cars used in this country, especially as regards the distance apart of the axles of the truck-wheels, the usual size of the wheels, and the construction of the bolsters? If yea, what is the general distance apart of the axles in the trucks, the size of the wheels, and manner of constructing bolsters of the trucks under eight-wheel *passenger-cars*?

8. Please answer the same inquiries in relation to eight-wheel *freight-cars*.

9. If you have stated that as a general thing the wheels in the trucks of eight-wheel freight-cars are placed nearer together than in those of passenger-cars, will you give any and all reasons for such difference of construction?

10. How near together are the wheels of the trucks under locomotive engines placed, as compared with those of eight-wheel cars.

11. Have you examined the Letters Patent issued to Ross Winans, dated October 1st, 1834, and the drawing and specification thereto annexed? If not, please examine the same, and explain in full the nature of the invention therein described, as you understand the same; and state the condition of railroad engineering, and usual speed of trains, prior to the date of said Letters Patent?

12. Please describe fully what difficulties were to be overcome, and what the object to be attained in the construction of a railroad carriage for passengers, to be drawn at a rate of 20 miles per hour over the railroads of this country, and the manner in which such difficulties have been obviated or such object attained by the arrangement described by the said Winans.

13. Please state whether or not, in your opinion, the said invention is sufficiently described in the said Letters Patent, to enable a "railroad car-builder" to put the same in practice. If not, wherein is it deficient?

14. Whether or not, in your opinion, would a car, constructed according to the description contained in said Letters Patent, be safe or otherwise, for the conveyance of passengers at high rates of speed, such as twenty or twenty-five miles per hour; and please give your reasons, and any facts which you may know, tending to sustain your opinion?

15. What knowledge have you respecting the use of such cars as are shown in the drawing annexed to said Letters Patent; and where have such cars been used, and to what extent?

16. What knowledge have you respecting the use of such trucks, or bearing carriages, as are described in the specification forming part of said Letters Patent, under the bodies of eight-wheeled cars, and under locomotive engines, and what have you had to do with the use of such trucks under eight-wheeled cars, or under locomotive engines? Please state *fully*, according to your recollection and knowledge.

17. Whether or not, in your opinion, would an eight-wheel car with trucks, constructed in the manner specially described in the Complainant's specification, i. e., with the axles of the wheels united by a strong spring, be useful on railroad cars for passengers and freight, and safe at a speed of twenty miles per hour; and, if not, why not? Please state any facts within your knowledge in relation to the subject of the question.

18. Whether or not, in your opinion, is the extent of bearing between the upper and lower bolster, shown in the drawing, forming part of the Complainant's patent, sufficient to render cars, drawn at a speed of twenty miles per hour, safe; and, if not, why not? If yea, please illustrate by facts known to you.

19. Please state whether or not the truck of an "eight-wheel car" is an independent organized creation, having an adaptation to a specific use, or whether any ordinary four-wheel car, used on the same road, may be substituted and used in the place of such truck, with equal utility and safety; and, if not, why not?

20. Please state according to your knowledge whether or not, in your opinion, the eight-wheeled passenger and freight cars now in general use upon the railroads of this country are substantially the same in principle of construction and mode of operation with those described by the said Winans in his said Letters Patent. If yea, what induces you to hold that opinion? If not, please point out any and all substantial differences, and whether or not the coning of the tread of the wheel is common to both.

21. What is your opinion upon the theory, in the Complainant's said specification, that "the best position of the wheels in each truck, to reduce friction between the flanges and the rail on curves, is as near together as they can be without touching"? and state any facts tending to support your opinion.

22. What opinion do you hold upon the theory, that "the best distance apart of the axles of the trucks, of eight-wheel cars, is the width of the railway track upon which they are run"? and state any experience or facts upon which you base your opinion.

23. Please state the advantages possessed by the "eight-wheel car" over a "four-wheel car," and in what manner such superiority manifests itself. Describe all fully.

24. Is there any position of the axles of a "four-wheeled car," which causes such car, or the load in it, to be carried with the least disturbance and greatest steadiness? If yea, please state what such position is.

25. Please state, as near as you can, the distance between the axles of the "four-wheeled cars," used under your observation, on any road; and state what roads.

26. Please state what is the least "radius of curvature" over which passenger-trains run at high speed, say twenty-five miles per hour, on the roads referred to in your last answer.

27. Please state what is the ordinary width of railroad tracks in this country; i. e. the distance between the rails in feet and inches.

28. Please state whether or not, in your opinion, the temporary use of two ordinary "four-wheel cars," for the transportation of long timbers resting, not fastened, on swivelling bolsters, placed across the middle of the length of the cars, and the whole drawn by an attachment of the power to the forward four-wheel car, would embody the principles, or exhibit all the essential characteristics, of the Complainant's invention. If not, wherein would such arrangement be deficient or differ therefrom?

29. Please answer the same question, — supposing that the four-wheel cars were connected by a strip of board fastened by the ends to the draw-pins, at the adjacent *ends* of each four-wheel car.

30. Please answer the last two questions, on the supposition that either and both of such arrangements were permanent.

31. Please state whether, in such arrangement for such purpose, it is or not necessary that the *front* and *rear* car should have a connection to prevent the cars from separating.

32. What would be the effect of a connection or junction *between* the frames of the two "*trucks*" of an eight-wheel car when used upon a railroad with curves?

33. Whether or not would a car constructed according to the drawing hereto annexed, marked "Quincy," embody the essential features of the Complainant's said invention? And, if not, wherein do they differ?

34. Have you examined the specification and drawings of a Locomotive engine patented by William and Edward W. Chapman, of England, in 1812, and published in the Repertory of Arts, vol. 24, second series, published in London, in 1814? If yea, please state for what purpose it was intended; upon what kind of a railroad was it to have been used; and in what manner was it to have been propelled?

35. What difficulty was the placing it upon six or eight wheels intended to obviate?

36. Please state whether or not, in your opinion, the essence or principle of the Complainant's invention is contained in the said description and drawings of Chapman; and if not, wherein do they differ? Where was the point of draft in the Chapman engine, and whether or not, in your opinion, is that important, and why?

37. Have you examined the drawings and descriptions of a Locomotive engine, set forth in a treatise on railroads, by Nicholas Wood, London, 1825? If yea, please examine the model shown you, marked W.; and state whether or not, in your opinion, it is a correct representation of the said engine, so far as the running gear is concerned. If not, wherein does it differ?

38. Please to state whether or not you find in the said *Wood's* treatise any description or drawing of a railroad car or carriage, substantially similar in construction and operation as that claimed by the Plaintiff and described in said Letters Patent. If not, wherein do they differ?

39. Whether or not, in your opinion, does the Engine described in said *Wood's* treatise, embody the principles of the car described by the said Winans, and in daily use upon the railroads in this country? If not, please state the distinctive differences.

40. Have you examined the treatise of Thomas Tredgold, on railroads and carriages, published in London, in 1825, and the other drawings therein contained of an eight-wheel carriage? If yea, please state what, in your opinion, is the carriage therein described and shown; what is its object, and its mode of construction and operation.

41. Please examine the model shown you, marked T.; and state whether or not, in your opinion, it is an accurate representation of the carriage therein shown. If not, wherein does it differ?

42. Whether or not, in your opinion, does the "*Tredgold car*," as set forth in said treatise, embody the principles or accomplish the purpose of the car described in the said patent of Complainant; and do you consider the said Tredgold car as the same in mechanical principle and mode of operation as the eight-wheel cars in common use? If not, wherein consists the difference?

43. Please examine plate iv., in Tredgold's treatise, and state where the point of draft is upon the car with eight wheels, therein set forth, and state upon what you found your answer.

44. Please examine the model shown you, marked O, and state whether or not, in your opinion, it represents a car substantially similar in principle and operation as that set forth in the Letters Patent of the Complainant, and whether such a car would accomplish the ends attained by the cars described in said patent? If not, wherein is it different, and wherein would it be deficient?

45. Whether or not, in your opinion, does a six or eight-wheeled locomotive engine, constructed with a four-wheel swivelling truck under the front part, and with driving wheels with rigid axles in the usual mode, contain the essential features of the Plaintiff's invention? If not, wherein does it differ?

46. Please to examine the model marked Q, shown you, and state whether or not, in your opinion, a car constructed according to said model would embody the essential features and properties of the car claimed by the complainant; and, if not, wherein would they differ?

47. Please to examine the drawing hereto annexed, marked "Columbus," and state whether or not, in your opinion, a car constructed according to said drawing would embody the essential features and properties of the car set forth in the said Letters Patent of the said Complainant.

48. Have you seen the *specification* annexed to Letters Patent, issued to Jonas Fairlamb, January 19th, 1833? If yea, do you find in the said specification any description of a car substantially the same as that described by the Complainant in his said patent? If not, wherein do they differ?

49. Have you seen the specification annexed to Letters Patent granted to Ephraim Morris, dated Oct. 15, 1829? If yea, please state whether or not, in your opinion, the said specification describes a railroad car substantially the same as that of the Complainant? If not, wherein do they differ?

50. What, in your opinion, are the distinctive features and properties of the Complainant's invention, which distinguish it from those eight-wheeled engines, or cars, or carriages which have been mentioned? Please state fully?

51. Are you or not acquainted with the eight-wheeled cars used by the Defendants on their road? If yea, are they or not substantially the same as those set forth in the said Letters Patent of the Complainant?

52. Were you at any time, and during what period, employed by, or connected with, the Baltimore and Ohio Railroad Company? If yea, in what position or capacity, and during what years?

53. Who was the chief-engineer of said railroad company, and who were his principal assistants in preparing the road and its machinery for use, prior to 1835?

54. Please to describe the manner in which the business of the said company was conducted by its different officers and agents, and state whether the duties of its several officers were general or specific; and state the system followed by which the board of directors became cognizant of the progress of the affairs of the company, or of work done by its agents and officers upon the road, and in the shops of the company.

55. Whether or not any experiments in regard to the adaptation or alteration of such kinds of machinery as was used on other railroads, were made upon said road by any one? And, if yea, by whom, under whose direction, what were they, and during what period of time were such experiments made?

56. When, and for what species of transportation, whether passengers or freight, was the first eight-wheel car designed for use on said Baltimore and Ohio Railroad; and when was the first eight-wheel car placed upon the said road; by what name was it designated; and by whom, or under whose direction, was it constructed?

57. Whether or not was the said first eight-wheel car then considered a novelty? And, if yea, by whom, and in what particular? And who was spoken of and commonly known as the author of said car, and whom do you believe to have been the inventor thereof? Please state the grounds of your belief.

58. Please state whether or not other cars were constructed upon the plan and proportions of the car "Columbus," after that car was placed upon said road? If yea, how many? If not, why not?

59. Have you any other knowledge relative to the construction and operation of other eight-wheel cars, used on the said Baltimore and Ohio Railroad, prior to the opening of the Washington branch of said road? If yea, state upon whose plans the said cars were constructed, and which of them were drawn by an attachment of the power to the body; and do the drawings annexed accurately represent such cars? And specify which is each by name.

60. Have you any knowledge respecting the eight-wheel passenger cars first used on the said Washington branch of said road? If yea, upon whose plans and under whose supervision were the said cars constructed? Were any, and, if yea, what alterations made in the arrangement of the bearing between the body and trucks of said cars? If so, for what reason and under whose direction were such alterations made?

61. How long were the said Washington cars continued in use; at what speed were the said cars propelled on said Washington branch of said road?

62. Does the drawing hereto annexed, marked W. B., accurately represent the said cars? If not, wherein does it differ?

63. When, if at any time, did you first learn that it was the intention of the Complainant, Ross Winans, to take out Letters Patent for an eight-wheel car?

64. What was the minimum radius of curvature in the line of said road; and what was the weight per lineal yard of the rail first laid as the track of said road?

65. Do you know or can you set forth, any other matter or thing, which may be a benefit or advantage to the parties at issue in this cause, or either of them, or that may be material to the subject of this your examination, or the matters in question in this cause? If yea, set forth the same fully and at large in your answer.

CIRCUIT COURT UNITED STATES, }
 MASSACHUSETTS DISTRICT. }

ROSS WINANS *vs.* THE EASTERN RAILROAD COMPANY,

IN EQUITY.

Cross-interrogatories directed to J. H. Alexander, ——— Hazlehurst, James Murray, and Samuel J. Hayes of Baltimore, on behalf of the Respondent.

ROSS WINANS *vs.* Railroad Company. — The Respondent gives notice that he objects to Plaintiff's interrogatory, No. 41, making inquiry in regard to a model marked T.; no such model having been filed in the office of the Clerk, or shown to the Respondent or to their Counsel before the filing of the cross-interrogatory.

The Respondent also makes the same objection to interrogatory marked No. 44, inquiring as to ascertain other model marked O, and for the same reason.

The Respondent also makes the same objection to interrogatory marked No. 46, inquiring as to a certain other model marked Q, and for the same reason.

The Respondent objects to the 57th question as being an inquiry into the opinion of third persons, and mere hearsay, and as to the belief of the witnesses, and that no answer to either branch of this question is admissible.

The Respondent objects to the question No. 58, because it assumes that the witnesses have stated that a certain car, called the Columbus, had been built and put upon the road; and is leading in form.

The Respondent objects to question No. 59, because it is leading in form.

2d. Because no drawings are annexed to the interrogatories of the Complainant, or exhibited to the Respondent's Counsel.

And they further object to the annexation to the Commission, or to the exhibition to any witness of any drawing which bears upon it W. B. or "Washington Branch," or words to that effect, as being leading and improper.

Also to any drawing, having upon it any name of any car, or the number or order of such car; or any other mark or sign or writing, which may explain to the witness what is the answer he is expected to give to my questions relating thereto.

The Respondent further objects to question marked No. 62, as being leading in form; and to the 63d, as irrelevant, immaterial and hearsay.

WILLIAM WHITING, *Counsel of Respondent.*

Cross-interrogatories to James Murray.

The Counsel for Respondent hereby gives notice, that, by filing the foregoing or following cross-interrogatories, he does not thereby intend to waive the right to have the testimony in this case closed and returned to the Clerk's office, according to the order of Court, and the mutual written agreement on file.

WILLIAM WHITING, *Counsel for Respondents.*

X 1. Did you ever in fact construct with your own hands any eight-wheel railroad passenger or freight car; or the running gear thereof?

X 2. Did you ever make the drawings or plans, or working drawings, of any eight-wheel double-truck railroad-car?

X 3. Did you ever personally superintend and give specific directions to workmen in building the running gear aforesaid?

X 4. If you have answered either of the foregoing cross-interrogatories affirmatively, will you now answer as to each car, or the running gear thereof, mentioned or inquired of in all of the foregoing cross-interrogatories, the following inquiries? —

When and where were said cars or running gear constructed, planned, drafted, or superintended?

Who were the workmen who received from you such shaft or superintendence?

Can you annex all drawings, if any, so referred to, to your answer?

Will you do so; and, if not, why can you not do so?

Will you state in relation to all such cars, or running gear, whether the cars were drawn by the body, and what was the mode of draft? Whether they bore the entire weight of the car-body upon the centre of the truck or bolster; and whether they had, or had not, what are commonly called side-bearings? Whether the axles of the wheels were united together by long springs, bolted, or otherwise secured to the boxes in which these axles turned? Whether they had wheel-frames? What was the length of the body of the car? What was its width and height? What was the size of the wheels; and the distance of the axles on each truck? What was the distance of the trucks apart; and the distance of the centre of the truck from the end of the body? What was the width or guage of the truck?

When, by whom, where, and how long, were each and all of such cars or running gear used?

X 5. If you have answered the fifth direct interrogatory in regard to the experience of American engineers generally, will you please to state what was your own business or occupation in the years 1829 and 1830; and at the time when the B. and O. Railroad was commenced? And will you further state whether in *those years* you were personally acquainted with the actual amount of knowledge and experience of the *engineers of America*, by professional and personal intercourse and conference with them, upon the various subjects of

railroad engineering; and, in particular, in relation to the subjects of railroad engineering? And will you give the names, occupation, and place of residence, of every one of the American engineers with whom you were in 1829 and 1830 acquainted; and whose knowledge and experience, as to railroad engineering, was in those years so definitely known to you, as to enable you to testify to what the extent of their knowledge and experience was at that time?

X 6. Are you aware whether or not any persons connected with the Baltimore and Ohio Railroad visited the Quincy Railroad, in Massachusetts? If so, whether or not did Winans ever make that visit, or say to either of you, or give you to understand, that he had ever been there? And when, and by whom of those persons connected with the Baltimore and Ohio Railroad, was said Quincy Road first visited?

X 7. If you have answered the 6th direct interrogatory, will you state what you understand to be meant by the words "*organized eight-wheeled car*" used in said interrogatory.

X 8. If you have answered the 7th direct interrogatory in relation to the trucks of eight-wheel passenger and freight cars in general use in this country, will you answer the following further inquiries in relation to the same cars, viz.:—

(a.) What is the *greatest* distance you have known between the axles in each truck, and on what roads were trucks having this distance used; and at what rates of speed?

(b.) Whether upon the best construction, and best *managed railroads* of Massachusetts, are not the most recently built cars so constructed as to have the axles of the trucks about as far apart as the gauge of the truck, or thereabouts?

(c.) Are the most modern cars so built in Massachusetts as to bear their entire weight upon the centre of the trucks; or do they have side-bearings; and where are these side-bearings usually placed?

(d.) Do the last-mentioned cars have square and rigid wheel-frames? Or do they have flexible wheel-frames?

(e.) Is the draft of said cars by means of a draw-spring coupling, connected usually with the king-bolt?

(f.) What is the length of the shortest and longest eight-wheel cars you have ever seen?

(g.) Is it not somewhat cheaper to build a *short truck* than a long one; other things being the same in each?

X 10. If you have answered the 10th direct interrogatory, will you state, if you know it, the distance apart of the axles of the wheels in the trucks of the last *locomotives* built at Taunton, Massachusetts, by Mr. Mason, or at Norris' Works at Philadelphia, or at the machine-shops of the Lowell and Worcester Railroad?

And what is the greatest distance at which you have known the axles of the truck-wheels in any locomotive engines to have been placed?

X 11. If you say that you have examined the Letters Patent of Ross Winans, and the specification and drawing thereto annexed, will you state whether you perceive any differences between the speci-

fication and drawing? If so, point out particularly all such differences.

X 12. If you state "the condition of railroad engineering," in answer to the 11th direct interrogatory, will you state all the books or authorities, and means of personal knowledge, upon which you rely for the statements you have made in such answer.

X 13. If, in answer to the 11th interrogatory, you have stated the usual speed of trains prior to Oct. 1, 1834, the date of said patent, will you please state the names of all the railroads in England, Ireland, Wales, and the United States of America, of which you had, as early as Oct. 1, 1834, any personal knowledge; and the usual speed of trains for passengers or freight on each of said roads? And will you state what were the names of all the railroads which were in operation in October, 1834, in each of these countries; and will you state whether the facts by you stated in answer to the 11th direct interrogatory were derived from personal knowledge, or from books, or otherwise? And state all your means of knowledge, except hearsay.

And are you not aware that trains for passengers had been run upon one or more English railways prior to Oct. 1834, at a rate of at least thirty miles per hour, from time to time?

X 14. What were the lengths of the radii of the curves of shortest or sharpest curvature on any English railways in 1834?

X 15. What is the length of the longest four-wheel cars now or recently in use in England, and how far apart are the axles of the wheels?

X 16. If you have answered the 12th direct interrogatory, and have stated the difficulties to be overcome, and the objects to be attained, as there inquired of, do you mean to be understood that those difficulties existed in the four-wheel cars when in use; or in what description of cars did those difficulties exist?

X 17. Will you state what changes of mechanical principles of construction and operation, if any, were introduced into the railroad cars, by substituting two swivelling trucks placed at or near each end of the body; instead of the ordinary rigid axles, fastened to the body in the manner of the ordinary four-wheel cars?

X 18. Have you stated all those changes inquired of in the last question? And, if not, will you state all the rest?

19. If you have answered the 13th direct question affirmatively, have you, in answering it, taken the specification and drawing together, or only the specification, in deciding whether the "invention" is sufficiently described to enable a car-builder in October, 1834, to put the same in practice? And do you mean, in your answer, that the "car-builder" should be one acquainted with car-building at the present day; or such car-builders as worked at that trade in 1834?

X 20. Whether or not, in your opinion, is the "*invention*" mentioned by you in answer to the 13th interrogatory, the same thing as the "*improvement*" claimed in the claiming part of R. Winans' said patent? If not, what is the difference; and are the differences material?

X 21. If you have answered the 14th direct interrogative affirma-

tively, and if you have stated in your answer that you have known any cars for passengers used ordinarily to run at high rate of speed, and which were constructed according to said Winans' specification, will you state what were the ordinary rates of speed at which any cars mentioned by you in your said answer were run; and do you know the fact as to the usual rates of speed, of your own knowledge?

Will you name the times and places at which each of said cars were made; where, when, by whom, and how long, each of said cars run; if they were run at all; and will you answer (in relation to each of said cars) hereinbefore mentioned, to the following inquiries, viz.: What was the length of the body; the mode of draft; the shape and extent of bearing by the upper upon the under bolster; the construction of the trucks; the distance of the axles of each truck; the distance of the flanges of the wheels? Were the axles of the wheels united by two long springs bolted to boxes in which the axles turned; were there any side-bearings; was there any wheel-frame?

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X 21, *continued.* Was the truck flexible; could the distance of the axles of the wheels from each other be changed by the action, elevation, or depression of the springs; were there more than two springs to each truck; and if so, where and how were they placed? Are said cars now in use? If so, where are they; and how do you know they are in use?

Do you mean to say, that the cars (if any) mentioned in your answer aforesaid to the 14th interrogatory, are safe to be used for passengers at the speed now ordinarily attained by express-trains on the fastest travelled railroads of New York or Massachusetts?

Do you now consider twenty or twenty-five miles per hour as high rate of speed? And would said cars, constructed according to said Winans' specification, be safe and reliable at the speed of forty or fifty miles per hour? If not, why not?

X 22. If, in answer to the 15th direct interrogatory, you say you have known cars there inquired of to be used, will you state *when* you *first* saw them used; where they were used, and how long and by whom they were used, and when and where you last saw them; and whether you have the means of knowing, and are able to state positively (22d continued), that the cars you saw were the same in the proportions and dimensions of the several parts, and in the arrangement thereof, as are represented upon said drawings?

X 23. If you have stated, in answer to the 16th direct interrogatory, that you have known any trucks such as are described in the Plaintiff's specification used under the bodies of any eight-wheel cars, will you answer in relation thereto the following inquiries, viz.: What was the name of each of said cars; the time and place where it was built; who were the persons that built it, sold it and used it; when

and where, and for how long, was it used; for what purpose was it used; and at what rates has it ordinarily run; what were the dimensions of its body; had the trucks any truck-frame; any side-bearings; any brakes; and, if so, how were they applied and operated?

How many springs were in each truck; how were they placed; and how connected with the frame or axles?

Will you give a complete description of each truck; including the size of the wheel and the exact distance (if possible) of the axles of the wheels from each other; and at what establishment were these trucks built?

X 24. If, in answer to the 18th direct interrogatory, you state that such trucks as are described in Winans' specification have been used under locomotive engines, will you give an exact description of such trucks, and answer the same inquiries relating thereto as were put in the 23d cross-question, in relation to the trucks under eight-wheel cars?

X 25. Do you consider that two such trucks as you say were used under locomotive engines, would, if placed under the two ends of an eight-wheel car without modification, be safe to run at the usual rates of passenger-travelling in New York or Massachusetts?

X 26. If trucks were constructed in the following manner, viz.: having no truck-frame, but uniting the two axles by two long springs, having each end of the springs bolted or otherwise secured to boxes, in which the axles should turn, having also a bolster bolted across from the middle of one spring to the middle of the other, having the (26 continued) whole weight of the body borne upon an upper bolster, which rested upon the under bolster at its *centre*, and not having side-bearings, but only a centre-bearing, — having the wheels very close together; would tracks so constructed be safe and reliable for passenger-cars, running upon the express-trains of the fastest travelled roads in New York or Massachusetts? If not, why not?

X 27. What is the "extent of bearing between the upper and lower bolster shown in the drawing," as referred to in your answer to the 18th direct question?

Would that extent be safe and sufficient to insure steadiness of motion on the express-trains in the 26th cross-question mentioned? If not, why not?

X 28. What do you mean by "*principle of construction and mode of operation*," in your answer to the 20th direct question? Will you state *all* that you understand to be meant by those words in that question?

X 29. Do you, or do you not, consider the use of "*wheels with coned treads*," as an essential part of the improvement described and claimed in the specification of the patent? If so, please quote the language of the specification and claim which requires the use of such "*coned*" wheels?

X 30. If you have answered the 32d question, do you intend to apply your answer to every possible mode of connection or junction between the two trucks? And do you suppose that your reasoning applies with equal force to all such modes?

X 31. What do you mean or understand by the language, "essence

or principle of the complainant's invention," as used in the 36th direct question?

Will you state what parts, or combinations of parts, which constitute an eight-wheel double truck-car, are contained in said Chapman's patent and drawings; what essential *parts*, which are described and claimed in said Winans' patent, are not found in said Chapman's patent (3 continued)? And quote the *language* of the *specification*, and also the language of the *claim* in which any part alleged by you to be wanting in Chapman are described and claimed by said Winans?

X 32. Whether or not do you consider the point of draft the car described in said Plaintiff's patent, as a mutual and essential part of the said Winans' supposed invention? If so, *why*?

X 33. Do you consider the point of draft as a mutual and essential part of the improvement set forth in said Winans' specification; and claimed by said Winans in his claim?

X 34. Have you not on some former occasion stated, that in the eight-wheel car shown in Tredgold's book, plate iv., there was no point of draft shown; or something to that effect?

X 35. If you have answered the 46th direct interrogatory, will you state the exact meaning you attribute to the words used in that interrogatory, "*the essential features and properties of the car claimed by the Complainant*"? And what is the distinction, if any, which you make between this phrase, "*essential features and properties*," and "*essence or principle of the Complainant's invention*," as used in the 36th question, and "*principle of construction and mode of operation*," as used in the 20th question?

X 36. If you have answered the 47th question in the negative, will you explain what you understand to be meant by the words of the question, "*essential features and properties of the car set forth*"?

X 37. Will you now reëxamine both figures of the drawing marked Columbus, and will you answer the following inquiries relating thereto:—

(a.) What do you suppose is intended to be represented by the two RINGS upon the lower drawing? What is their use and mode of operation; and is it or not to act as a *centre-bearing*?

(b.) What is the use of the wheels of the trucks; and what is the distance of the flanges apart, in feet or inches; and what is that distance estimated in proportion to the diameter of said wheels; and does it exceed one semi-diameter?

(c.) Is it your opinion that a truck constructed in all other particulars in precise accordance with the directions in the specification of the patent, would not embrace all the essential improvement claimed in the patent, provided the distance of the flanges of the wheels in each truck were equal to a semi-diameter of the wheel (taking wheels of the ordinary and usual size), and the track of the road of the usual width?

(d.) Suppose that a car were in all other respects in exact accordance with the specification, excepting that the wheels were as far apart as represented in the drawing marked "Columbus," now shown

you; would, or would not, the car thus constructed then embody all that is essential in the improvement claimed in the patent; and would it be substantially such a car as is described in the specification? If so, please state your reasons. If not, please state your reasons for the contrary opinion.

(e.) If the said car Columbus was built in all respects according to the specification, excepting that the draft was not by the body, would said car then embody all that is essential in the improvement claimed in the patent?

(f.) If the car Columbus were in all respects built according to the specification, excepting that the bearing points of the body upon the trucks were placed at a distance from the ends of the body equal to about one-fourth part of the length of the body, would said car then embody all that is essential in the improvement claimed in the patent? If so, why? if not, why not?

(g.) If the car Columbus were built in all respects according to the specification, excepting that the bearing of the weight of the body upon the trucks was upon what are called independent side-bearings, in part or in the whole, instead of its being borne exclusively upon a centre-bearing, would such a car embody all that is essential in the improvement claimed in the patent? What are your reasons for your opinion?

(h.) If a car were built according to the drawing marked Columbus, in all other respects, excepting that the draft was by the body, so as to leave the trucks free to be guided by the rails, would the car thus constructed be substantially such an one as is described and claimed in the patent?

X 38. What do you understand by the terms used in the 50th question, "destructive features and properties of the Plaintiff's invention"? And do you or do you not consider that all those "features and properties" are claimed in the patent? If not, which are, and which are not, so claimed? And do you or do you not mean by the "Plaintiff's invention" the railroad eight-wheel car described in the specification, or shown in the drawing?

X 39. If you answer the 51st direct question affirmatively, will you please to describe such cars as are used by the Defendants on their railroad, in the following particulars?—Length of body; size of wheels; greatest and average distances of axles in each truck; distance from the ends of the body or platform; of the bearings of body or trucks; distance of the flanges. Describe the mode of constructing the truck-frames, swinging bolsters, side-bearings, housings, or pedestals and springs, safety-beams and shafts, draw-spring couplings, and every other particular in regard to their construction; their fastest rates of speed and average rate of speed on express trains; mode of supporting the middle of the body, and of preventing it from sagging.

X 40. If you answer the 51st question, will you also state whether the cars used by the Defendants on this railroad have all the weight of the body borne upon the centre of the bolster and the centre of the trucks, or do they have side-bearings?

Do they have rigid truck-frames, or are the axles of the wheels united together by long springs, bolted, or otherwise secured to the boxes in which those axles turn?

X 40 *continued*. Do they have a bolster passing across from one spring on one side of the truck to the other spring upon the opposite side of the truck, and fastened or bolted down on to those springs?

Do they have the flanges of the wheels very close together, or are they generally from twenty to twenty-eight inches apart? If not, how far apart are they?

Do they have the bearings of the body upon the centre of the track, at the extreme ends of the body? And if not, how far distant from the ends are such bearings? What is the greatest distance? What the ordinary distance?

Do you know all the facts stated by you in relation to the eight-wheel cars used by the Defendants, of your own knowledge? If not, what facts have been stated by you *not* of your own knowledge?

X 41. Have you seen the drawings annexed to the Letters Patent of Jonas Fairlamb, mentioned in the 48th direct interrogatory, or a copy thereof? If yea, whether or not do said drawings exhibit the running gear of an eight-wheel railroad-car which embraces or embodies the arrangement of the eight wheels and connection thereof with the body of the car, as claimed in the claiming part of said Winans' patent? If not, explain all the differences, and the reasons for your opinion.

X 42. What is the length of body suggested and recommended in Winans' specification, as compared with the ordinary four-wheel car; and what is that length in feet and inches, as nearly as you can state? And what was the ordinary length of the common four-wheel cars used in the year 1834, on the railroads of the United States?

X 43. May the length of the body of eight-wheel cars be increased or diminished so as to be longer or shorter than twice the length of the ordinary four-wheel cars in use in 1834, while at the same time the car shall still come within the description of Winans' specification or claim? What are your reasons for your opinion?

X 44. Does such increase or diminution of the length of the body (while the car in all other respects conforms precisely to said Winans' specification) introduce any new mechanical principle into its structure or mode of operation? If so, what new principle is so introduced; and to what extent must the length of body be increased or diminished, in order to make the car substantially different from that described in the specification? Will you please answer this question as definitely as possible.

X 45. Do you or not think that a car ten or twelve feet in length, conforming in all particulars to the requirements of the specification (excepting as to the length), would be embraced within the said specifications and claim? If not, why not? And will you answer the same question on the supposition that the car was sixty feet in length?

X 46. Will you state whether, in an eight-wheel railroad-car built in strict accordance with the Plaintiff's specification, any considerable change may be made in *the distance of the axles of the wheels on each truck*, without introducing some new principle of construction or mode of operation? And, if yea, will you state substantially to what extent such distance of axles may be so varied, and under what conditions or circumstances will increasing such distance cause the truck to be essentially different from those described and claimed in the patent?

Do you or do you not find that any criterion whatever is laid down in the specification, by which it can be ascertained to what extent such distance of axles may be varied without changing the principles of construction or mode of operation of the truck? And will you quote the language of the patent in which you find such criterion or direction given? And state what are the directions in the specifications by which a car-builder in 1834 could clearly distinguish such an arrangement of the wheels of each truck as were within the claim of the patent, from such arrangements as were not within such claims? Will you also answer the last inquiry, upon the supposition that the car-builder had *no drawing* to guide him, but only the specification?

X 47. Whether or not, in your opinion, may the distance of the bearing (of the body of the car upon the trucks) from the ends of the body be increased or diminished in the eight-wheel car, as described in the specification, without introducing thereby any new principle of construction or mode of operation? If so, what is the greatest distance from the end of a car-body sixty feet long, at which the bearings might be placed without so altering the car as to exclude it from the terms of the specification and claim? Will you please answer the same question, supposing the car-bodies forty feet — thirty feet — twenty feet — and twelve feet — respectively?

X 48. Is there any thing different in the operation or in the mechanical principles of the four-wheel car and of the Plaintiff's bearing carriages, having the wheels the same distance apart, so far as relates to the friction of the wheels upon the rails, facility of passing curves, or any other action of the wheels upon the rails, or the reaction of the rails upon the wheels? If so, state what it is.

X 49. What is the essential mechanical principle upon which the body of the car is connected with the trucks, according to Plaintiff's specification; and what are the peculiar characteristics of the mode of making that connection, as described in the specification; and what are the results or effects thereof, in your opinion; and wherein does such mode of connection and such results differ from the other modes of connection and results attained, or capable of being altered, [attained?] by any of the inventions or models mentioned by any of the foregoing direct or cross-interrogatories?

X 50. What is there, if any thing, which distinguishes the mode of constructing the truck especially described and recommended in the Plaintiff's specification, from any and all of the other trucks belonging to any of the inventions mentioned in any and all the preceding cross-

questions? And what difference is there between the Plaintiff's said truck and the other aforesaid trucks, in their mode of action or operation? Will you state all the difference, if any there be between them, and the reasons for your opinion?

X 51. If an eight-wheel double truck railroad-car be so constructed as to embody those proportions of distances between the wheels of each truck and between the two trucks themselves, which proportions you consider to be essential to the arrangement described in the specification and set forth in the claim of the Plaintiff's patent,—will you state whether such a car could embrace or embody all that is essential and substantial in order to constitute such a car as is claimed in the Plaintiff's patent? In other words, is any thing else, besides and in addition to these proportions of distances, necessary to make the car substantially such as is embraced within the specifications and claim of the patent? If yea, what is it?

X 52. Does the employing larger or smaller wheels upon the truck of an eight-wheel car, other things being the same, introduce any new mechanical principle or mode of operation?

X 53. Does the bringing the flanges of the wheels nearer together, or removing them farther apart, merely by enlarging or diminishing the size of the wheels, introduce any new mechanical principle or mode of operation?

X 54. If, in answer to the 52d, 53d, or 54th direct interrogatories, you have stated any specific fact, will you state whether you know such facts and all of them, of your own personal knowledge, or from hearsay? Or have you derived them, or any of them, from information verbal, written, or printed, obtained from others? If from written or printed documents, will you annex the entire documents to which you refer, stating also their respective titles?

X 55. If, in answer to the 54th direct question, you state that the directors of the said company became cognizant of the progress of the affairs of the company, or of the work done by its agents and officers upon the road, and in the shops of the company by means of reports made by different officers, agents, or servants of the company, will you annex to your answer all such reports conveying such information to said company relating to the construction or use of cars upon said railway during the years 1829, 1830, 1831, 1832, and 1833, or true copies thereof; or will you refer to the passages of said reports, giving the year, page, and name of the report on which you rely?

X 56. Were the reports or any of them mentioned by you in your answers to the 54th question, or to any other question, published in the periodical called the American Railroad Journal, or in any other printed publication, published for or during the years 1829 to 1833, inclusive; or for or during either of these years? And if any reports to the president or directors of the said company respecting cars are not contained in the publications you name for those years, please annex full copies of these reports; and will you state whether you are the author of either of those reports? And was either of these reports signed by you? And also [who?] was the author thereof?

X 57. Were there not from 1829 to 1834, inclusive, distinct and separate shops in which the different departments of car-building was carried on, viz. the blacksmithing, the painting, the wood-work for the bodies, and the truck-shop? If yea, state who were the persons who had the immediate and personal superintendence of each of these shops respectively; or, in other words, who was the boss of each of said shops.

X 58. How many hands or workmen were employed in each of said shops? Please name all you were personally acquainted with in 1830, 1831, 1832, 1833, and 1834; and state what shops each worked in. Have you now stated the names of all whom you knew at that time?

X 59. Were you acquainted with George Gillingham? When did you first become acquainted with him? Was he superintendent of the Baltimore and Ohio Railroad, and for and during what years? What were his duties on said road? Have you stated all his duties on the road and to the company? Will you state all his duties as superintendent and otherwise? Is he now dead? How do you know what his duties were?

X 60. Was Jonathan Knight chief engineer of said road, and also when and for how many years, and for what years?

X 61. If, in any of your answers, you have undertaken to state any thing in relation to the powers, duties, or authority, or want of authority of any person or persons whatever in the employ of the said B. & O. R. R. Company, will you (61 continued) state how you know, of your own knowledge, the powers, duties, or authority, or want of authority; and, if your knowledge is derived from any by-laws, or other written rules, and regulations of said company, will you produce the same, or a true copy thereof, and annex them to your answer?

X 62. If you answer the 55th question affirmatively, will you state what each one of the experiments were, when they were made, who was present? State all the personal knowledge you possess concerning each of them. If you state they were made under any person's *direction*, state what that person directed to be done, to whom the directions were given, whether such directions were written or verbal. What was the language or the substance of the language used, to whom it was addressed; what was done; and what was the result of the experiment. State all you personally know of each experiment embraced in your answer to the 55th question?

X 62½. What was the fastest speed at which the Columbus ran at any time? And please answer the same inquiry as to the Winchester, Dromedary, and Comet.

What was the usual and ordinary rate of speed of trains on the Baltimore and Ohio road in 1834 and 1835?

X 63. Do you know, of your own personal knowledge, *when* the first eight-wheel car was designed for use on the Baltimore and Ohio Railroad? Did you see any design or draft thereof made in your presence? And, if so, when and where was it made?

X 64. If, in answer to the 56th direct question, you have said that the car called the "Columbus" was built under Ross Winans' direc-

tions, do you mean to be understood that he had a general superintendence of the department in which the car was built? And, if so, do you make that statement from your own personal knowledge? If so, state how you know it.

X 65. If you have said that the car Columbus was built or constructed by or under the directions of Ross Winans, will you state the names of the persons who built it? State the language or substance of each and every direction you personally heard given, and the name of each person to whom such direction was so given; the names of all persons present at the time; and the time when, and place where, each direction was given.

X 66. Do you know, of your own personal knowledge, that the car Columbus was built in all respects like the drawing shown to you by the Commissioner? If not, in what respect do they differ?

X 67. Where and when did you last see said car Columbus, and what became of her?

X 68. What is the *scale* on which the said alleged drawing of the car Columbus is made?

X 69. Will you give the description of the plan and proportions of the car Columbus (if you have said that any other cars were or were not built upon the same plan and proportions), in the following particulars:—Length of body, size of wheels, distance of axles in each truck, distance of bearing of body upon the truck from the two ends of the body?

Will you give the same details in relation to each of the other cars mentioned in your answer to the 58th direct question, and state the names of the cars, the date when each was finished?

X 70. If, in answer to the 59th question, you have stated that any other cars subsequent to the Columbus were made and used on the Baltimore and Ohio Railroad previously to the opening of the Washington Branch, and if you have stated upon whose *plans* those cars were constructed, will you now state what plans you refer to in said answer? Will you annex the same or copies thereof to your answer? Did you see said plans yourself, at the time said cars were built? Did you see any person draw or make said plans? When and by whom was each of said plans made? How do you know, of your personal knowledge, who made said plans, if any were made? And state *how* you know, if you do know of your own personal knowledge, who was the author of said plans.

If you have referred, in your said answer, to any directions verbal or written, in relation to said cars, given by any one to any one in your presence, state the person's name; who gave them; the persons who received them; when and where they were given; who was present; and the language and substance of each and every one of such directions.

X 71. Will you answer all the inquiries contained in the 70th cross-interrogatory, in the same manner as though they had been made in reference to the cars first used on the Washington Branch Railroad?

X 72. If you have answered the 67th question affirmatively, will

you state whether you know the facts stated, of your own knowledge, and how you know what was the position and duty of Mr. Canduce Gatch? If from printed documents or by-laws, please annex the same, or a copy thereof, to your answer. Do you know all that passed between said Andrew Gatch, and George Gillingham, and Jonathan Knight?

X 73. Are you not aware, that, previously to the construction of any eight-wheel passenger or freight-cars upon the Baltimore and Ohio Railroad, there were rough eight-wheel cars made of two four-wheel bearing-carriages, and used in the transportation of long, strong pieces of timber, and other wood, &c.?

X 74. Are you not aware that, in fact, Canduce Gatch did buy materials, hire men, and superintend them, and did give directions as to the building of the running gear of cars from time to time on said railroad, and in the shops thereof? And will you state what orders, if any, did you ever hear given in your presence to Canduce Gatch by any person? If any, state, if you please, what said orders were; who gave them; who was present at the time; and when and where were they given.

And if you have made any statement as to the authority that Canduce Gatch had or had not, in relation to ordering or making cars, will you also now state, if you know of your own knowledge, that he had or had not the authority you have attributed to or denied him? And do you know, of your own knowledge, what authority he had from George Gillingham, or from any other person or officer on said road, excepting yourself?

X 75. (*De bene esse.*) If in any answer you have said that the car Columbus was believed by you to have been invented by Ross Winans, or that at any time he had in his possession any drawing of an eight-wheel car, will you please state whether the original design of said car was made in your presence? And if so, when, where, and by whom was it made? Who has it, and where is it now, if any such exists? Will you produce the same, or a true copy thereof, and annex it to your answer, and state whether said copy is a true and exact copy of said supposed original design, used in the construction of the said car? If so, where, when, and by whom was it used?

Will you answer the same inquiries in relation to the Dromedary, Winchester, and Comet, as have been just made in relation to the car Columbus? And will you state whether every word of your answers, in relation to the Columbus and the other cars, is made from personal knowledge, or from information derived from others? And what part of your answer is derived from one, and what from the other?

X 76. If you have stated the name of any person as the one who designed the Washington cars, or constructed them, will you please state whether you personally saw said design or plan made? And if yea, when, where, and by whom was it made? And will you annex a true copy of said original design or plan, compared and certified by yourself, from which said cars were built? Will you state at what

time said cars were commenced; who did the work upon them; who did the wood-work; who built the trucks; and whether they differed from the Comet, or the Dromedary, or the Winchester, in the construction of the trucks; and in what respects the trucks differed from those belonging to either and each of these cars? Will you describe particularly the said Washington cars, in the following respects?—

First, Length, width, and height of body. Second, Size of wheels, distance of axles of wheels in each truck; size, shape, materials, and mode of construction of the truck-frames; distance of centre of trucks from the ends of the body and platform. Whether they had side-bearings. And will you mention all other particulars calculated to explain the construction of the running gear, and its connection with the body?

X 77. Was the said car Columbus, as well as the Winchester, Dromedary, and Comet, put into public use for the transportation of passengers upon the Baltimore and Ohio Railroad? If so used, for how long time were they used, and when were they respectively first put in use? And was such use with the knowledge, consent, and approbation of Ross Winans? And how many years has each of said cars continued in use?

X 78. Whether or not had Ross Winans any contract or agreement with said Baltimore and Ohio Railroad Company, in relation to his services on said road, or the machinery thereof? And have you ever seen the original, or a copy of said contract? And will you annex the same or a copy thereof, to your answer?

And was either said cars run for said Baltimore and Ohio Railroad Company? And by what officers or employer of the company was each or either of said cars run?

X 79. Are you now, or have you been at any time, employed by Ross Winans, or by any party interested in this suit? Have you been employed by Mr. Winans to get up evidence in relation to the extension of any of Mr. Winans' patents, or otherwise; or have you assisted, directly or indirectly, in preparing or conversing with any witnesses who have been, or are to be, examined in this case, or in any of Mr. Winans' cases in relation to this patent? And have you ever had, or have you now, any direct or indirect interest in the said patent, or in any of the Winans' patents, or in this suit, or in any suits of said Winans?

Have you at any time been connected with the said Winans, or either of his sons in business? If so, when, and how long?

X 80. Did the flanches of the car-wheels run outside or inside of the rails, when the first passenger-cars on said Baltimore and Ohio Railroad began to run; and when was the alteration made so that they should run inside; and how do you fix the date?

X 81. What is the length or radius of the sharpest curves on the Baltimore and Ohio Railroad in the city of Baltimore, where the track turns the corners of the streets? What was the same in 1834?

X 82. Have you ever been employed by Ross Winans in any business whatever; and are you now in his employ constantly, or from time to time?

X 83. Have you ever seen, heard, or read, or heard read or stated, or obtained knowledge of the substance of any one of the direct or cross interrogatories which you have answered in this case, or all of them? If yea, will you state where, and when, and how you obtained such knowledge; who communicated it to you, or permitted you to learn, hear, see, read, hear read, the substance of said interrogatories or cross-interrogatories, or either of them, at any time before giving your testimony before the Commissioner; and whether you have conversed with Mr. Winans or Charles D. Guild, or their Counsel, before giving your testimony?

Have you heard read, or obtained knowledge of any of the testimony or opinions given by other persons upon any of the questions put to you, or of any affidavits, or what purported to be copies of affidavits, given in any of said Winans' previous cases, relating to said patent?

Are you acquainted with any of the witnesses who have been examined before the Commissioner, or otherwise, in Mr. Winans' cases, in relation to the eight-wheeled car patent? If so, which of them have ever been or now are employed by said Winans, or in or about the establishment in Baltimore, with which said Winans is connected?

X 84. [*De bene esse.*] If you answer the 63d direct question, will you please state how long before the date of Ross Winans' patent, was the specification of said patent drawn up, or reduced to writing; and do you know, of your own knowledge, that it was or was not drawn up at an earlier or later date than you now mention?

X 84½. Will you describe the timber cars, and all the kinds thereof, that you are aware were used on the Baltimore and Ohio Railroad, before the introduction of the first eight-wheel passenger cars there?

(*Special to George W. Whistler.*)

X 84¾. Did you make an affidavit on or about the 9th of August, A. D. 1848, for the purpose of assisting or obtaining the extension of the said patent for improvements on the eight-wheel car? And, if so, will you annex a true copy thereof to your answer? Said affidavits inquired of, being the one sworn to before James Buchanan, and now on the files of the Patent Office.

X 85. Do you know or recollect any other fact which may be of benefit to the Defendants in this case? If so, will you state the same?

WILLIAM WHITING, *Solicitor of the Respondents.*

Special Cross-interrogatories to James Murray.

X 1. Are you now, or have you been, a member of the firm of Murray and Hazlehurst, steam-engine builders?

X 2. Did you not at one time build cars for the Baltimore and Ohio Railroad Company, having larger springs to the trucks, which extended across from one axle to the other? Are they the same of which you have testified? If so, will you state whether there were, or were not, several of the tower *traves* of said springs of the same length? Were there or not saddles upon said springs?

X 3. Have you not said, in presence of any gentleman, that, if you were to build trucks now, you would not again build them in the same way, or words to that effect?

X 4. Are not the best passenger-cars upon the Baltimore and Ohio Railroad built at the *North*; and do they not have rigid wheel-frames? Please describe them. Do you not find that the Northern cars are best in practice? Where, or at what establishments, are the best of the Northern passenger-cars built, or said to be built?

X 5. Will you now answer the 83d cross-question?

WILLIAM WHITING, *Solicitor of Respondents.*

Special Cross-questions to be propounded only to S. J. Hayes.

X 1. Are you now superintendent of machinery on the Baltimore and Ohio Railroad?

X 2. Did you recently make a report upon the subject of locomotive engines used upon the said railroad, and state your views of the merits of the locomotives built in the shops of the Baltimore and Ohio Railroad Company, as compared with those built by or in the establishment of Ross Winans, usually called Winans' engines? If so, will you annex a copy of said Report to your answer; and state whether, according to the best of your knowledge, judgment, and belief, the facts and views set forth in said Report are true and correct.

X 3. At what distance apart are the wheels in each truck of the most recently and best constructed passenger-cars used on the Baltimore and Ohio Railroad now placed? State the size of wheels, and the distance of the centres thereof.

X 4. Are not most, if not all, of the passenger-cars now in use on said railroad built at the *North*; and do not they have rigid wheel-frames; the distance of the bearing points of the wheels upon the track about the same as the width of the track; between the rails; and do not they have side-bearings; and are they not substantially like the cars used upon the best Northern railroads? If not, state in what respects they differ.

X 5. Will you answer the same inquiries as to the cars *now* used for passengers upon the Washington Branch?

X 6. If you have said that a number of cars have been used on the said Baltimore and Ohio Railroad, constructed like that represented in the *DRAWING* attached to Winans' patent, will you state at what average rates of speed they have been used?

X 7. Will you now answer again the 83d question?

WILLIAM WHITING, *Respondents' Solicitor.*

Deposition of James Murray.

ON the twenty-first day of February, in the year eighteen hundred and fifty-four, JAMES MURRAY appeared before me. And the said James Murray having been by me first carefully examined, and cautioned, and duly sworn to testify the whole truth, and being examined on the interrogatories annexed to the Commission, deposed, answered, and said, —

1. To the first interrogatory. My name is James Murray. I am in the forty-third year of my age, reside in the city of Baltimore, and am a civil engineer by profession, and am now engaged in the manufacture of steam and other machinery, as one of the partners of the firm of Murray and Hazlehurst. I have been engaged in railway service upon the Baltimore and Ohio Railroad, and upon that part of the Philadelphia, Wilmington, and Baltimore Railroad between Baltimore and Havre de Grace, in all nearly sixteen years. I have had much experience in the study and practice of mechanical science in the service of the above-named companies on the line of their roads, and since 1847 as a partner of the firm of Murray and Hazlehurst, in the city of Baltimore. For eight years, from 1839 to 1847, whilst in the service of the Baltimore and Ohio Railroad Company, I had charge of the department of machinery in connection with other duties.

2. To the second interrogatory. I do know the Complainant, Ross Winans, and have known him by sight since 1831 or 1832, and personally since about 1837; since 1837 I have been well acquainted with him. He was employed in the service of the Baltimore and Ohio Railroad Company when I first became acquainted with him by sight in 1831 or 1832, and remained in the service of the company, I think, until 1837 or 1838. Since that time he has been engaged in the construction of railway machinery, locomotives principally, in the city of Baltimore.

3. To the third interrogatory. I have testified as an expert in patent cases in Courts of Justice frequently; but I cannot state the number of times with any certainty. I can't call to mind all the subjects; but I have testified several times in relation to the Woodworth planing machine, and also several times in relation to railway machinery.

4. To the fourth interrogatory. It was my duty, during a portion of the time I was in the service of the Baltimore and Ohio Railroad Company, viz. from 1839 to 1847, to give directions in regard to the construction of every class of their machinery, the running gear of railroad cars included, and also as to the repairs and management of all the machinery. The whole supervision of the machinery department during that time was under my control.

5. To the fifth interrogatory. The amount of information possessed in this country, with regard to the subject of railways and railway machinery in 1829 and 1830, was exceedingly small. According to the best of my knowledge, there was no railroad in operation at that time, except perhaps the Quincy Railroad in Massachusetts. There was a deputation sent to England by the Baltimore and Ohio Railroad Company, to obtain information respecting the subject of railroads. Numerous experiments were also made under the direction and at the expense of the company, by persons in their employment; and among the persons engaged in making such experiments for the company, was Ross Winans.

6. To the sixth interrogatory. I cannot state precisely the year, but think it was in the year 1832 or 1833, that I saw the eight-wheel car Columbus upon the Baltimore and Ohio Railroad. This was the first eight-wheel car I ever saw. My recollection with regard to its details is very indistinct; but it was an eight-wheel passenger car. I was at that time in the service of the Baltimore and Ohio Railroad Company, but was engaged in making the surveys for the branch road to Washington. I was in the habit of coming occasionally to Baltimore; in doing which I used to get into the cars at the relay-house, and come by them to Baltimore. And I recollect, in 1832 or 1833, coming to Baltimore in the car Columbus.

7. To the seventh interrogatory. I am acquainted with the general construction of the truck of eight-wheel passenger and freight cars used in this country. The distance apart of the axles of the truck-wheels varies in some degree with the size of the wheels, and accordingly as the road upon which they run is more or less curved, and is generally from about forty inches to four feet. The size of wheels varies also upon different roads; upon some their diameters being so small as thirty inches, and upon others so great as thirty-six inches, the usual size being thirty-three inches in diameter. The mode of constructing the bearing bolsters of the trucks for passenger-cars is various. The most approved mode is believed to be that of suspending a beam upon springs between the two central transverse-pieces of the truck. In many instances, however, the bolster consists of a simple beam of wood extending from side to side of the truck, and resting upon the side-pieces of the truck-frame alone; and in some others of iron, supported in the same way. In other cases the bolster is of less dimensions, and is supported nearer its middle by intermediate fore and aft pieces in the truck-frame.

8. To the eighth interrogatory. My reply to this question is the same as to the preceding one, so far as the distance apart of the axles of the truck-wheels and the sizes of the wheels is concerned; except

that, as a general thing, the distance between the axles of the truck-wheels is somewhat less in freight than in passenger-cars.

The manner of constructing the bolsters of the trucks varies in some degree upon different roads, and in some instances upon the same road. The modes most in use, however, are the same as the last two described in my reply to the preceding question.

9. To the ninth interrogatory. The reasons for placing the axles of the truck-wheels of passenger-cars further apart than those of freight-cars are in some instances for the purpose of obtaining more space for the framing connected with the bolsters, and in others, and generally for the purpose of giving greater steadiness to the motion of the cars upon the straighter parts of the road at high rates of speed. In the case of freight-cars, the speed being generally less than for passenger-cars, the construction of the frame-work of the truck is now simple; and, the object being to pass around the curves with the least possible resistance, the axles of the wheels of trucks are generally brought nearer together.

10. To the tenth interrogatory. They are generally somewhat nearer, but I can't state precisely how much; the distance being often controlled by circumstances connected with the construction of the engine.

11. To the eleventh interrogatory. I have examined the Letters Patent issued to Ross Winans, dated Oct. 1, 1834, and the drawing and specification thereto annexed.

The object of the invention, as I understand it, is to obtain a car which will pass around curves of a railway with freedom and greater safety than can be obtained by a four-wheel car at similar rates of speed, and also for the purpose of obtaining more easy motion to the persons or articles carried. These objects are accomplished first, by the formation of two four-wheel trucks, the axles of the wheels of which are placed in each truck as near together as may be convenient; and, secondly, placing these trucks under or near the ends of a long body, so as to admit of freedom of action on the part of the trucks.

The condition of railroad engineering, at the date of the Letters Patent, was in its infancy; the usual rate of passenger-trains, prior to that date, was from twelve to fifteen miles per hour.

12. To the twelfth interrogatory. The difficulties to be overcome were the passage of sharp curves upon railroads at a high rate of speed, which could not be effected by the ordinary four-wheel car, because, if the axles were placed far enough apart to render the motion of the car sufficiently steady, they were too far apart for safety and ease of traction, their tendency being to fly off the track, and their resistance to traction very great. The object, therefore, to be attained in the construction of railroad-carriages for passengers, was to obtain a car free from these objections, which has been accomplished by the car patented by Mr. Winans, in the manner described in my answer to the preceding question.

13. To the thirteenth interrogatory. It is sufficient.

[Adjourned until the 22d day of February, 1854.]

On the 22d day of February, 1854, the said James Murray again appeared before me, and further deposed, answered, and said, —

14. To the fourteenth interrogatory. I believe that cars constructed according to the description contained in said Letters Patent, would be safe for the conveyance of passengers at the rate of twenty or twenty-five miles per hour. The fact is, that a car of that construction has been run on the Baltimore and Ohio Railroad at that rate of speed.

15. To the fifteenth interrogatory. I know that such cars were used on the Baltimore and Ohio Railroad, and have been used for many years, and still continue to be used in large numbers.

16. To the sixteenth interrogatory. I remember the original car under which these trucks were used on the Baltimore and Ohio Railroad; and the trucks of that car continued to be used until about 1840, certainly as late as 1840, and I think later. Subsequently many other trucks of the same description, that is to say, with a single spring, reaching from axle to axle, were used under both passenger and freight cars, and locomotive engines, upon the Baltimore and Ohio Railroad. These were built under my direction, and gave me entire satisfaction.

17. To the seventeenth interrogatory. Such cars would be safe, in my opinion. The facts upon which I base my knowledge are given in reply to the fifteenth and sixteenth interrogatories.

18. To the eighteenth interrogatory. I believe the extent of the bearing between the upper and lower bolsters, shown in the drawing, if accompanied by the checks provided for by the rounding of the upper bolster, as also shown in the drawing, is sufficient to render cars drawn at a speed of twenty miles per hour, safe. The facts known to me, in proof of my opinion, are that such bolsters were used safely at such speed for a number of years on the Baltimore and Ohio Railroad. These bolsters were abandoned, because being made of cast iron, in case the car was thrown from the track, they were more liable to be broken than those made of wood, and also because they were more expensive than the wooden bolster.

19. To the nineteenth interrogatory. The truck of an eight-wheel car is an independent organized creation, having an adaptation to a specific use. The ordinary four-wheel car could not be used permanently for the same purpose, unless specially prepared for the purpose, by the transverse bolster and pivot-plates, nor unless the length and width of framing, and the distance apart of the axles, were adapted to the purpose.

20. To the twentieth interrogatory. The eight-wheel passenger and freight cars, now in use upon the railroads of this country, are substantially the same, in principle of construction and mode of operation, with those described by the said Winans in his Letters Patent. I hold this opinion because I have examined the specification, and am acquainted with cars in general use upon the railroads of this country, and believe the cars in general use to be substantially the same in principle with the invention described in Winans' specifica-

tion; the only difference being in the distance between the axles in the trucks, which in the modern cars is somewhat greater than that recommended by Mr. Winans in the specification. The coning of the tread of the wheel is common to both; all railroad-wheels that I have ever seen are more or less coned.

21. To the twenty-first interrogatory. I believe that the theory is correct, that the best position of the wheels in the truck, to reduce friction between the flanges and the rail on curves, is as near together as they can be without touching; but experience has shown, that trucks so constructed are less steady than those in which the axles are farther apart, at high rates of speed upon the straighter portions of a railroad; and therefore a compromise between that which offers the least resistance in passing around curves, and that which affords greater steadiness upon the straight parts of the road, has been generally adopted.

22. To the twenty-second interrogatory. I do not agree with the opinion, that, as a general thing, the best distance apart of the axles of the trucks of eight-wheel cars is the width of the railway-track upon which they are run. There might be cases in which such distance, or even a greater distance apart, for passenger-cars, would be advantageous; such, for instance, as roads upon which very high speed was to be attained, and upon which the curves were slight; but, as a general thing, I do not believe so great a distance apart as the width of the track advisable, for the reasons that there is greater resistance, as well as risk, in passing around curves, and that the framing of the trucks must be necessarily more heavy and expensive.

23. To the twenty-third interrogatory. The advantages of the eight-wheel car over the four-wheel car consists in its greater steadiness and safety at high speeds.

24. To the twenty-fourth interrogatory. There is such a position; that is, to place the axles at the ends, outside the load.

25. To the twenty-fifth interrogatory. I do not remember the exact distance between the axles of four-wheel cars generally, but I think it somewhere from four to six feet; in some special instances, it may be somewhat greater.

26. To the twenty-sixth interrogatory. Six hundred feet upon the Baltimore and Ohio Railroad, which is the road I am best acquainted with. There were curves on said road of four hundred feet radius, through which a speed of twenty miles per hour, and perhaps twenty-five miles per hour, has been attained.

27. To the twenty-seventh interrogatory. Four feet eight and a half inches.

[Adjourned until the 27th day of February, 1854.]

And on the 27th day of February, 1854, the said James Murray again appeared before me, and further deposed, answered, and said, —

28. To the twenty-eighth interrogatory. The temporary use of two ordinary four-wheel cars for the transportation of long timbers, resting,

not fastened or swivelling bolsters, placed across the middle of the length of the cars, and the whole drawn by an attachment of the power to the forward four-wheel car, would not, in my opinion, embody the principles, nor exhibit the essential characteristics, of the Complainant's invention,—the difference being, that by the Complainant's invention, the power is applied to the body of the car, and the trucks are left free to adapt themselves to the curvatures of the road. In the other case, there would be restraint upon the action of the forward truck.

29. To the twenty-ninth interrogatory. In addition to the restraint mentioned in answer to the preceding interrogatory, the case presented in this interrogatory would impose restraint upon the hindmost car or truck, and involve a further departure from the principles of the Complainant's invention.

30. To the thirtieth interrogatory. If, in the case mentioned in the twenty-eighth interrogatory, the arrangements were permanent, and there was but one car to be drawn, there would be little difference in effect between it and the ordinary eight-wheel car; but if other cars were to be attached, as I infer is intended by the question, to the after-end of the hindmost truck or car, the after truck or car would be controlled in some degree by the power transmitted to the car behind it, and the car would thus be deprived of one of the most essential features of Winans' invention, viz. that of allowing freedom of play to the trucks. The application of the power in both instances to the forward truck would lead it around the curves, and have a tendency, in some degree, to relieve the pressure of the flange of the forward wheel upon the outer rail of the curve; on the contrary, the attachment of the after-part of the hindmost truck to cars in the rear would have the reverse effect.

The connection of the two cars or trucks by a strip of board mentioned in the 29th interrogatory would cause longitudinal movement of the bearing points or pivots of the trucks in passing around curves and through switches, and would therefore be a departure from one of the essential principles embodied in the eight-wheel car of the Complainant.

31. To the thirty-first interrogatory. It is.

32. To the thirty-second interrogatory. The effect would be to cause longitudinal movement of the bearing points of the trucks.

33. To the thirty-third interrogatory. I do not find any drawing marked "Quincy" annexed to the Commission; but I have before me a drawing which, I have been informed, represents a car which was used on the Quincy Road, and which I annex, marking it "Quincy" (in Appendix, see drawing, so marked), and placing my name upon it. The car represented in this drawing does not embody the essential features of Winans' invention,—there being no provision for swivelling of the trucks, nor king-bolt represented for forming a connection between the platform-trucks, and the wheels being farther apart than recommended by said Winans in his specification; and the trucks or cars represented in the drawing show means of attachment to the ends of the trucks, and not the load.

34. To the thirty-fourth interrogatory. I have examined the specification and drawings of a locomotive engine patented by William and Edward W. Chapman, as contained in the 24th volume of the Repertory of Arts, 2d series, published in London in 1814. The purpose for which the locomotive was intended, was that of drawing loads upon railways; judging from the explanations of figure 8, I suppose it was intended to run upon either train or edge railways. It was to have been propelled either by steam or other power, through a system of chains, drums, and pulleys.

35. To the thirty-fifth interrogatory. The difficulty of passing around sharp curves, and that of too great weight upon any of the wheels of the locomotive.

36. To the thirty-sixth interrogatory. The swivelling principle of the truck appears to be the same in both: the distance apart of the axles is, however, much greater than that recommended by Mr. Winans. I can see nothing to indicate where the point of draft or connection between the locomotive and its train was made in the Chapman locomotive engine. It is important that the connection for the draft should be made to the body, and not to the trucks, for the reasons I have given in answer to interrogatories 28, 29 and 30.

[Adjourned until the 9th day of March, 1854.]

And on this 9th day of March, in the year 1854, the said James Murray again appeared before me, and further deposed, answered, and said:—

37. To the thirty-seventh interrogatory. I cannot answer this interrogatory, because it has been a long time since I have examined the treatise referred to in the interrogatory, and because there is no model shown to me, as the interrogatory supposes.

38. To the thirty-eighth interrogatory. I do not remember any such.

39. To the thirty-ninth interrogatory. I cannot say.

40. To the fortieth interrogatory. I have examined the treatise of Thomas Tredgold, mentioned in this interrogatory. The object, as expressed by Mr. Tredgold in the treatise, is the equal distribution of the weight of the load between or over eight wheels. The mode of construction indicated shows a means of adapting the wheels to the inequalities of the surface of the rails; but whether or not there was any means used for the purpose of allowing the trucks to swivel so as to adapt them to the curves of the road, does not clearly appear from the drawing, and no such principle is pointed out or referred to in the description.

41. To the forty-first interrogatory. No such model as that referred to in the question has been shown to me; and I cannot, therefore, answer.

42. To the forty-second interrogatory, The absence of a clear indication of the swivelling principle of the trucks in the Tredgold car, which is an essential feature in the Winans' or ordinary eight-wheel car, is the only material difference between the two, except that

the wheels are placed somewhat farther apart in the Tredgold car than in Winans'.

43. To the forty-third interrogatory. There is no point of draft indicated in the plate, that I can perceive.

44. To the forty-fourth interrogatory. There being no such model shown to me, I cannot answer the interrogatory.

45. To the forty-fifth interrogatory. A locomotive engine with six or eight wheels, constructed with a four-wheel swivelling truck under the front part, and with driving-wheels with rigid axles in the usual mode, does contain some of the most essential features of Winans' invention, such as the swivelling of the truck, and proximity of the wheels of the truck; but the machine as a whole differs from Winans' eight-wheel car in not having two swivelling trucks.

46. To the forty-sixth interrogatory. There being no model shown to me, I cannot answer the question.

47. To the forty-seventh interrogatory. I have examined the drawing annexed to the commission marked Columbus. A car constructed according to said drawing would not embody the most essential features and properties of the car set forth in Winans' Letters Patent. The swivelling principle of the trucks, though the distance between the axles of the trucks is considerably greater than is recommended in the specification annexed to his Letters Patent, and the drawing of the Columbus, indicates that the draft was from a perch attached to the truck, in reference to which the specification is silent; but the drawing annexed to the specification shows the point of draft to be from the body of the car.

48. To the forty-eighth interrogatory. I have not seen the specification, and cannot therefore reply to the interrogatory.

49. To the forty-ninth interrogatory. I have seen and examined the paper hereto annexed, headed "Specification of Ephraim Morris' Patent; Exhibit No. 2," upon which paper I have written my name (see Appendix, page); but whether it be the specification referred to in the interrogatory or not, I do not know. If it be, the car described in it is not substantially the same as that of Winans. As I understand the car described in the specification I have annexed, the invention claimed consists simply in a means of equally distributing the weight upon or between the eight wheels of a car; there being nothing said in regard to the swivelling property of the trucks, which is an essential feature in the Winans car.

50. To the fiftieth interrogatory. The distinctive features and properties of Mr. Winans' invention, as I understand it, are the swivelling property of the trucks, the contiguity of the wheels of the trucks, and, as in the drawing annexed to the specification, the point of draft from the body. So far as any of these are embraced in any of the eight-wheeled engines or cars which I have mentioned in my answers, there is similarity; but in none of them do I find combined all of the features and properties which I have above enumerated as being embraced in Winans' invention, as I understand it.

51. To the fifty-first interrogatory. I am not acquainted with the cars used by the Defendants on their roads.

52. To the fifty-second interrogatory. I entered the service of the Baltimore and Ohio Railroad Company as an assistant in making surveys of the Washington Branch Railroad, in the year 1831; and continued in the service of the said company as an assistant in making surveys and locations, until, I think, the latter part of the year 1835, when I quit the service of the company. I returned again to their service in the early part of 1838, when I took charge of the repairs and reconstruction of the railways, as an assistant to Benjamin H. Latrobe, the officer then in charge of that branch of the service. In 1839, the superintendence of the department of machinery was added to my other duties. In this capacity I continued in the service of the company until the month of June or July, 1847.

53. To the fifty-third interrogatory. Jonathan Knight was the chief engineer. Benjamin H. Latrobe and Henry J. Rauney were his principal assistants in making the surveys and location of the road. John Elgar, Ross Winans, and George Gillingham, were his principal assistants in the machinery department. There were also, in various capacities in the road department, Caspar W. Weaver, Col. Jacob Small, and James P. Stabler. All of these, I think, were in the service of the company prior to 1835.

54. To the fifty-fourth interrogatory. I know nothing personally, prior to 1838, of the matter inquired of in this interrogatory. The general rules subsequent to that period were, that all subordinate officers should report to their principals all matters pertaining to their duties; and the principal or chief officer of each department should transmit with his report, or embody in the same, the reports of his several subordinates, or their substance, to the Board.

55. To the fifty-fifth interrogatory. I cannot answer this interrogatory specifically, because most of the experiments alluded to in this interrogatory were made prior to my connection with that department of the service of the company.

56. To the fifty-sixth interrogatory. The first eight-wheel car of which I had any knowledge on said road, was the passenger-car Columbus. But whether this was the first eight-wheel car used upon that road or not, I am unable to say; nor can I say, of my own knowledge, under whose directions it was constructed, nor when it was first placed upon the road.

57. To the fifty-seventh interrogatory. The car Columbus, when I first saw it, was considered a novelty. But I do not remember, and cannot specify by whom particularly, it was considered a novelty; nor can I state from recollection who was considered the author or inventor of said car. I can't tell who was the inventor.

58. To the fifty-eighth interrogatory. I do not remember to have seen any other car constructed upon the plan and proportions of the car Columbus, and do not know, and cannot say, why others were not so constructed.

59. To the fifty-ninth interrogatory. The three cars represented by the drawings Nos. 1 (Car) and 4 (Car), annexed to the commission, I think I recollect to have seen in use on the Baltimore and Ohio Railroad, prior to the opening of the

Washington Branch; but I have no particular recollection of the details of the construction; and cannot, therefore, say whether the drawings accurately represent them.

60. To the sixtieth interrogatory. I recollect that, when the Washington Branch was first opened, cars similar to the drawing No. 5 (Car W. B. Washington car—see Appendix) were put upon said road for use; but I cannot speak with certainty in regard to any alterations which may have been made in the arrangement of the bearing between the body and the trucks of said cars; nor do I know upon whose plans, or under whose supervision, the said cars were constructed.

61. To the sixty-first interrogatory. I cannot answer precisely how long said cars were continued in use, though some of them were in use on said road as late as 1847. They were ordinarily propelled at the rate of about twenty miles an hour; but frequently the speed attained was as great as thirty miles per hour, and sometimes even faster. These rates of speed were on the Washington Branch Road.

62. To the sixty-second interrogatory. To the best of my recollection, the drawing accurately represents the car.

63. To the sixty-third interrogatory. I knew nothing of his intentions until after the patent was issued.

64. To the sixty-fourth interrogatory. The minimum radius of curvature upon the Washington Branch Road was, I think, about twelve hundred feet, and the weight of rail about thirty-nine pounds per yard. But the cars of the Washington Branch Road, in passing to and from Baltimore and Washington, passed over about eight or nine miles of the main stem of the Baltimore and Ohio Road, upon which there were curves of so short a radius as four hundred feet; and the track was composed of strong pieces of wood, upon which a bar of iron two and a quarter by five-eighths of an inch was laid.

65. To the sixty-fifth interrogatory. I cannot think of any thing at this time that would be of advantage to either party, to my knowledge.

[Adjourned until the 10th day of March, 1854.]

And on the 10th day of March, 1854, the said James Murray again appeared before me, and, being examined on the cross-interrogatories annexed to the commission, further deposed, answered, and said :—

X 1. To the first cross-interrogatory. No.

X 2. To the second cross-interrogatory. Yes.

X 3. To the third cross-interrogatory. Yes.

X 4. To the fourth cross-interrogatory. Whilst I was superintendent of the department of machinery on the Baltimore and Ohio Railroad, I drafted the plans of both cars and running gear, and superintended their construction. I filled that position from 1839 to 1847, during which time I planned and superintended the building of a great number of cars; the number of which, and the times at which they were severally built, I cannot give. The plans, instructions, and

superintendence were given to various employees of the Baltimore and Ohio Railroad Company; amongst whom I would mention as the most prominent, Thatcher Perkins, Peregrine Biddle, and Jacob Shryack. I cannot annex any of the drawings to my answer, because they are not in my possession; and I presume they are in all probability destroyed or mutilated.

All the cars made under my superintendence, or from plans furnished by me, were drawn by the body (except from wheel-trucks for hauling wood, lumber, and stone, which were, in many instances, drawn by a pin upon the end of the perch). All eight-wheel cars bore the weight upon the centres of the trucks or bolsters. In some instances, they had spring side-bearings, for the purpose of checking the rolling motion of the body in passing around curves and over the uneven portions of the road; in other instances, they had no side-bearings, but simply check-plates or stops, to prevent extreme or excessive rolling motion, one foot from the king-bolt on each side. In many cases, the cars were constructed with long springs secured to the boxes in which the axles turned; and, in other instances, they were secured to a truck-frame. The cars were of various dimensions, which I am now unable accurately to remember. The wheels used on the Baltimore and Ohio Railroad are and were mostly thirty-one inches in diameter; some were thirty.

I cannot state the precise distance of the axles apart in the trucks in all cases; but they varied, according to the best of my recollection, from thirty-eight to forty-two inches. In some of the older cars, the distance, I think, was less than thirty-eight inches; but of this I am not positive. The distance of the trucks apart varied according to the length of the car. I cannot state accurately the distance of the centres of the trucks from the ends of the body; but they were as near the ends of the body as they could be conveniently placed. The width of gauge of the track was generally four feet eight and a half inches; in some places, where the curves were short, the gauge was as much as four feet nine inches. All of such cars and running gear were used on the Baltimore and Ohio Railroad, or its branches, for a number of years; and many are still in use.

Since I quit the service of the Baltimore and Ohio Railroad, the firm of Murray and Hazelhurst have been building cars for said company according to plans furnished by the company, in which the trucks consisted of a wooden frame with pedestals and springs to each wheel, the wheel thirty-one inches in diameter, and the axles placed about forty inches apart; in other respects they were substantially the same as those I have above spoken of.

X 5. To the fifth cross-interrogatory. In 1829 and 1830, I was engaged in completing my education. I was not at that time acquainted with experience of the engineers of America. All the knowledge I have of the experience of engineers at that time is derived from their published writings, reports, &c., since examined by me.

X 6. To the sixth cross-interrogatory. I have no knowledge of any person visiting the Quincy Railroad who was connected with the

Baltimore and Ohio Railroad, and never heard Winans mention the subject, to the best of my recollection.

X 7. To the seventh cross-interrogatory. My understanding of the words "organized eight-wheel car," used in said interrogatory, is a car built with eight wheels, with all the proper appliances necessary to adapt it to the road upon which it is to run, and to be used as an eight-wheel car only.

X 8. To the eighth cross-interrogatory. I cannot answer with any accuracy as to the greatest distance between the axles in the trucks of eight-wheel cars that I have seen. I am not able to state what is the practice in Massachusetts on this subject of late years, nor as to the position of the bearing upon the trucks, nor as to the rigidity or flexibility of the wheel-frames, nor any other matter with reference to said cars, not having paid particular attention to the subject of late years, so far as regards the practice in Massachusetts.

X 10. To the tenth cross-interrogatory. I cannot answer as to the locomotives mentioned in this interrogatory, because I have not seen or examined them. I do not remember the greatest distance between the axles which I have seen under any locomotive.

X 11. To the eleventh cross-interrogatory. The specification speaks of and recommends a single spring reaching from axle as the best form of truck, and states others may be used, whilst the drawing shows a truck composed of a wooden frame with a spring to each wheel. The specification is silent in regard to the point of draft which the drawing indicates to be from the body.

X 12. To the twelfth cross-interrogatory. My reading has been very extensive on the subject of railways and railway engineering; and it would be impossible for me to enumerate at this time all the books I have read, or the sources from which I have derived information.

X 13. To the thirteenth cross-interrogatory. My answer to the eleventh direct interrogatory, so far as it applies to the speed of trains, was intended to apply to speed upon railways in this country at that time; and I can't speak with any certainty as to the rate of speed then attained in other countries, or the number of railroads then in existence.

X 14. To the fourteenth cross-interrogatory. I don't remember.

X 15. To the fifteenth cross-interrogatory. I can't answer.

X 16. To the sixteenth cross-interrogatory. They existed in the four-wheel cars then in use in connection with curved roads.

X 17. To the seventeenth cross-interrogatory. I am at a loss to comprehend what is meant by the interrogatory; but supposing it to be intended to ascertain the difference in principle between an eight-wheel car with the axles all rigidly fixed in the framing of the car, and an eight-wheel car built with two swivelling trucks placed at or near each end of the body of such car, the difference consists in the swivelling of the trucks in the one case, by which means the car may adapt itself to the curves of the road; whilst, in the other case, the car, if of considerable length, unless the wheels were grouped together under the centre of it, could scarcely be drawn around the ordinary short curves of railroads.

X 18. To the eighteenth cross-interrogatory. I have stated them so far as I understand the question.

X 19. To the nineteenth cross-interrogatory. The specification alone would be sufficient to enable an experienced car-builder, or one who had previously seen the cars built prior to that time, to build the car according to the specification.

X 20. To the twentieth cross-interrogatory. In my opinion, the invention mentioned in the thirteenth direct interrogatory is the same as the improvement claimed by Ross Winans in the claiming part of his specification.

X 21. To the twenty-first cross-interrogatory.

[Adjourned until the 14th day of March, 1854.]

And on the 14th day of March, 1854, the said James Murray again appeared before me, and further deposed, answered, and said:—

X 21. To the twenty-first cross-interrogatory. The ordinary rate of speed was about twenty to twenty-five miles an hour,—this I know of my own knowledge. I can't state precisely when those cars were made, nor by whom they were made, of my own knowledge; nor can I state how long said cars ran upon the road with accuracy; but they ran upon the road for a number of years, and generally until they were worn out. I cannot state the length of the bodies as they varied: the mode of draft, as far as I can remember, was from the body, except in the case of the Columbus. The shape and bearing of the bolsters varied, and I cannot specify the particulars. The construction of the trucks differed, as did the distance between the axles and the flanges of the wheel. Some of the trucks were constructed with a single spring on either side connecting the axles of the wheels, and others were constructed with wheel-frames. The trucks were not flexible, except so far as elasticity made them so. The cars with single spring-trucks, built under my own direction, were flexible, vertically. The position of the axles could be changed slightly by the action of the springs in most instances. Some of the cars had but two springs, and others more, in which case a spring was placed over either end of each axle; and in some cases additional springs were placed over the end of the bolster as a check to prevent rocking motion. I do not know whether said cars are now in use or not. Some of the cars I have mentioned would not be safe at very high rates of speed, say forty to fifty miles per hour. I do not consider twenty to twenty-five miles per hour to high rate of speed *now*. At the rate of forty or fifty miles an hour, which can only be attained with safety upon roads with curvatures of very large radius, the distance between the axles of the trucks should be greater than in others, as recommended by Mr. Winans in his specification in all respects. Cars constructed according to the specification would be safe at those rates of speed.

X 22. To the twenty-second cross-interrogatory. I cannot state when I first saw the cars mentioned in this interrogatory first used: they have been, however, for a number of years, and still continue to

be, used upon the Baltimore and Ohio Railroad. I have seen such cars recently upon said road. The cast-iron bolsters represented on the drawing have, however, been discontinued, and substituted by others of wood. I cannot state positively that the proportions and dimensions are identical with those set forth in the drawing; but, judging from the eye, there is no material or substantial difference. The distance between the axles of the trucks in the cars more recently constructed and rebuilt is somewhat greater than indicated by the drawing.

X 23. To the twenty-third cross-interrogatory. The name of the original car alluded to in my reply to the 16th direct interrogatory I do not remember; nor do I know the time, or, of my own knowledge, the place at which it was built, nor the persons who built it. It was used on the Baltimore and Ohio Railroad for a number of years, but for what period I cannot state. It was used to transport passengers, and ran at the rate of from fifteen to twenty miles per hour ordinarily. I do not remember the dimensions of its body. The trucks had no truck-frame; nor had it, if my memory serves me right, any side-bearings. I can't remember accurately as to the brakes, but think it had brakes; nor how they were applied or operated. There were two springs in each truck, and they were united to the ends of the axles by means of the box-bearings, and connected together by a bolster. I can give no further general description of the truck; nor can I state the exact size of the wheels, nor the exact distance of the axles from each other, nor of my own knowledge where they were built.

X 24. To the twenty-fourth cross-interrogatory. Trucks having two springs connected by a bolster of iron, embodying all the principles described in Winans' specification, have been and are used under locomotive engines; but they differ so much in the details of their construction, that it is impossible for me at this time further to answer this interrogatory.

X 25. To the twenty-fifth cross-interrogatory. If proportioned properly, they would.

X 26. To the twenty-sixth cross-interrogatory. Trucks constructed in the manner described in the interrogatory would be safe, if the wheels were of proper size, so as to throw the axles sufficiently far apart.

X 27. To the twenty-seventh cross-interrogatory. The diameter is from thirty to thirty-six inches. It would be safe if accompanied by the check spoken of in my reply to the eighteenth direct interrogatory.

X 28. To the twenty-eighth cross-interrogatory. I mean the use of two independent trucks under one body, left free to adapt themselves to the curves and inequalities of the road, the draft being from the body of the car.

X 29. To the twenty-ninth cross-interrogatory. I consider the coned wheel essential in all descriptions of railway carriages designed to be used on curved roads; but I do not understand Mr. Winans to claim the invention of the coned wheel as a part of his improvement.

X 30. To the thirtieth cross-interrogatory. No. My answer was

intended to apply to a simple junction, such as was contemplated by question 29.

X 31. To the thirty-first cross-interrogatory. I understand the principle of the Plaintiff Winans' invention to consist in the combination of the organized eight-wheel car. Chapman's patent and drawings contain one of the essential features of the Winans eight-wheel car, viz. the swivelling of the truck; but it differs from the Winans car in placing the load upon friction-rollers, at some distance from the centres of the trucks, that of the Winans car being upon the centres. The Chapman truck differs from the Winans truck in having the wheels in the truck proportionately much farther apart; nor is there any thing in the drawing or specification by Chapman to show what position under the body the trucks were designed to occupy, nor any thing in regard to the point of draft. The specification and drawing, taken together, show all these features to exist in the Winans eight-wheel car; and, in combination, I understand them to form his invention. It is impossible to quote any particular passages from either of the specifications to establish the facts set forth in this answer; for they can only be gathered from reading the whole of the specifications, and taking the drawings in connection with them.

X 32. To the thirty-second cross-interrogatory. I do consider it material to the Winans eight-wheel car that the point of draft should be from the body, in order that the trucks may be left free to adapt themselves to the curves and inequalities of the road.

X 33. To the thirty-third cross-interrogatory. The specification is silent in regard to the point of draft; but the drawing annexed to it shows the point of draft to be from the body of the car, which, as before stated, I deem to be material.

X 34. To the thirty-fourth cross-interrogatory. I have no recollection of making such statement, except in reply to one of the direct interrogatories.

X 35. To the thirty-fifth cross-interrogatory. I did not answer the interrogatory, as there was no model exhibited to me.

X 36. To the thirty-sixth cross-interrogatory. I did not answer the question in the negative, and I refer to said answer as the fullest reply I can give to this interrogatory.

X 37. To the thirty-seventh cross-interrogatory. I understand the two rings in the lower drawing to indicate bearing plates. It would appear that they are designed to act as a centre-bearing, although there is nothing in the side-view, as shown by the upper drawing, to indicate that that is their purpose. There is no scale annexed to the drawing by which the size of the wheels or their distance apart is indicated. But they are represented to be about one half of the diameter of the wheel apart, which would make the whole distance from centre of the wheels one and a half times their diameter.

A truck constructed according to Winans' specification, with the distance between the flanges of the wheels in each truck equal to half the diameter of the wheel, supposing the wheel to be of the ordinary size and the track of the usual width, would embrace, so far as the truck is concerned, all the essential improvement claimed in the

patent; but a truck so constructed would not be well adapted to roads upon which the curves were of short radius. And a car constructed according to the Winans specification, excepting that wheels were as far apart as represented in the drawing of the Columbus, would embrace the essential features of the said Winans invention; the material part of said invention being, in my opinion, the swivelling of the trucks and their centre-bearings, in combination with the draft from the body. The draft from the body I deem essential to the invention.

I would deem a car, when the bearing points upon the trucks were placed at a distance from the ends equal to one-fourth part of the length of the body, as embodying the essential features of Winans' improvement, provided the other parts were built in accordance with the specification; but the placing of the trucks nearer to the ends of the body, I think preferable. A car, the body of which is supported upon the trucks by side-bearings *in whole*, would not embody all that is essential in the improvement claimed in the Winans patent; but if supported only in part upon side-bearings, if those bearings be springs or yielding, it would not prevent it from embodying the principles of Plaintiff's invention.

A car built according to the drawing marked Columbus, in all other respects excepting that the draft was by the body, would be substantially such a one as is described and claimed in the Winans' patent, although inferior in its proportions.

X 38. To the thirty-eighth cross-interrogatory. My reply to the fiftieth direct interrogatory gives as full an answer to this interrogatory as I can give.

X 39. To the thirty-ninth cross-interrogatory. I have no knowledge of the matters inquired of in this interrogatory.

X 40. To the fortieth cross-interrogatory. I have no knowledge of the matters inquired of in this interrogatory.

X 41. To the forty-first cross-interrogatory. I have not seen the Letters Patent of Jonas Fairlamb, or the specification annexed to them.

X 42. To the forty-second cross-interrogatory. The length of the body recommended in Winans' specification is twice the length of the ordinary four-wheel car; but what the length of the ordinary four-wheel car in 1834 was, I cannot state, as it varied on different roads.

X 43. To the forty-third cross-interrogatory. Certainly it may, as the nature of the improvement does not depend upon the length of the body, although greater length of body is favorable to steadiness of motion.

X 44. To the forty-fourth cross-interrogatory. The increase or diminution of the length of the body does not introduce any new mechanical principle into its structure or operation.

X 45. To the forty-fifth cross-interrogatory. I do think it would be embraced within the specification and claim of Winans, whether the car were ten, twelve, or sixty feet in length, provided in other respects it conformed to the requirements of said specification.

X 46. To the forty-sixth cross-interrogatory. There would be no new principle introduced, as I understand it, by changing the distance between the axles of the wheels in each truck. The specification recommends the placing of the wheels close together for the purpose of passing around curves with freedom; but it does not indicate any particular distance, nor does it fix a maximum. I can perceive directions in the specification by which a car-builder in 1834 could clearly distinguish such an arrangement of the wheels of each truck as were within the claim of the patent, from such arrangements as were not within such claims; the specification gives a description of the improvement patented.

X 47. To the forty-seventh cross-interrogatory. The distance of the bearing of the body of the car upon the trucks from the ends of the body, does not, in my opinion, affect the principle, although it will materially modify or affect the action of the car, it matters not what the length of the car may be.

X 48. To the forty-eighth cross-interrogatory. There is no difference in the operation or in the mechanical principle of the four-wheel car and of the Plaintiff's bearing carriages, having the wheels the same distance apart so far as it relates to the friction of the wheels upon the rails, facility of passing curves, or any other action of the wheels upon the rails, or the reaction of the rails upon the wheels, provided the point of draft be from the *centre* of the four-wheel car.

X 49. To the forty-ninth cross-interrogatory. The essential mechanical principle involved in the connection of the body of the car with the trucks, according to the Plaintiff's specification, is the centre-bearing and swivelling motion, by which means the weight of the load is equally distributed amongst the wheels, and the trucks are left free to adapt themselves to the curves and inequalities of the road; and so far as any of the other modes of connection alluded to by any of the inventions mentioned in the foregoing direct or cross-interrogatories or answers effect the same object, so far they are alike in principle.

X 50. To the fiftieth cross-interrogatory. The distinguishing peculiarity of the truck especially described and recommended in the Plaintiff's specification is the use of the long spring reaching from axle to axle of the wheels in the trucks, the placing of the wheels near together, and the absence of the ordinary wheel-frame. They do not differ in their mode of action or operation, except in degree, from the ordinary trucks.

X 51. To the fifty-first cross-interrogatory. There is also the point of draft from the body, which I consider essential.

X 52. To the fifty-second cross-interrogatory. It does not, except in degree.

X 53. To the fifty-third cross-interrogatory. None, except in degree.

X 54. To the fifty-fourth cross-interrogatory. All the facts I have stated in answer to the interrogatories mentioned were stated from my own personal knowledge.

X 55. To the fifty-fifth cross-interrogatory. I have stated nothing which I have derived from the reports made to the President and Directors of the said company.

X 56. To the fifty-sixth cross-interrogatory. I have referred to no such reports.

X 57. To the fifty-seventh cross-interrogatory. I have no precise personal knowledge on the subject; not being at that time engaged in that department.

X 58. To the fifty-eighth cross-interrogatory. I had no knowledge concerning the shops at that time, or of the persons employed in them.

X 59. To the fifty-ninth cross-interrogatory. I was acquainted with George Gillingham. I don't know when I first became acquainted with him. He was at one time superintendent of machinery on the Baltimore and Ohio Railroad; but for how long a period I can't say, of my own knowledge, nor during what years; but it was prior to 1838. I have no personal knowledge of what his duties were, except that he was called superintendent of machinery, and appeared to be acting in that capacity. He is dead, I believe.

X 60. To the sixtieth cross-interrogatory. Jonathan Knight was chief engineer of the Baltimore and Ohio Railroad Company when I entered its service in 1831, and continued such chief engineer, I think, until about 1842.

X 61. To the sixty-first cross-interrogatory. I have not undertaken any thing of the kind.

X 62. To the sixty-second cross-interrogatory. I did not answer the question affirmatively.

X 62½. To the sixty-second and half interrogatory. I cannot undertake to say what was the fastest rate of speed made by the Columbus, Winchester, Dromedary, or Comet. The ordinary rate of running speed on the Baltimore and Ohio Railroad in 1834 and 1835, for passenger-trains drawn by locomotives, was from fifteen to eighteen miles per hour.

X 63. To the sixty-third cross-interrogatory. I do not.

X 64. To the sixty-fourth cross-interrogatory. I don't know any thing about the building of the Columbus.

X 65. To the sixty-fifth cross-interrogatory. I have not said any thing in reference to the building of the Columbus.

X 66. To the sixty-sixth cross-interrogatory. I do not.

X 67. To the sixty-seventh cross-interrogatory. The last place I saw the Columbus was on the Baltimore and Ohio Railroad; but when I cannot say, nor what became of her. She was, I believe, broken up.

X 68. To the sixty-eighth cross-interrogatory. I do not know.

X 69. To the sixty-ninth cross-interrogatory. I have not said that any other cars were or were not built upon the same plans and proportions as the Columbus, and cannot therefore further answer the interrogatory.

X 70. To the seventieth cross-interrogatory. I have not stated any thing as to the author of the plans, or said any thing about directions in reference to the cars referred to in this interrogatory.

X 71. To the seventy-first cross-interrogatory. I know nothing in relation to the authorship of the cars first used on the Washington

Branch Road, of my own knowledge, and heard no directions given concerning the manner of building them.

X 72. To the seventy-second cross-interrogatory. I have said nothing in reference to the position or duties of Mr. Canduce Gatch in the service of the Baltimore and Ohio Railroad Company, and know nothing of what passed between the parties named in this interrogatory.

X 73. To the seventy-third cross-interrogatory. I am not.

X 74. To the seventy-fourth cross-interrogatory. I know nothing of any of the matters inquired of in this interrogatory.

X 75. To the seventy-fifth cross-interrogatory. I know nothing of the matters inquired of in this interrogatory.

X 76. To the seventy-sixth cross-interrogatory. I have not stated who designed or constructed the Washington cars; and do not, of my own knowledge, know.

X 77. To the seventy-seventh cross-interrogatory. I believe the said cars were put into public use on the Baltimore and Ohio Railroad. Such use must have been known to Ross Winans; but whether it was with his approbation and consent I do not know, nor do I know how long such use continued.

X 78. To the seventy-eighth cross-interrogatory. There was a contract existing between Ross Winans and the said company, the original or a copy of which I have seen; but I have not the possession of the original or of a copy, and cannot therefore annex it to my answer.

Said cars were run upon the Baltimore and Ohio Railroad by some of the agents or employees of said company; but I do not now remember whom.

X 79. To the seventy-ninth cross-interrogatory. I am not now, and never have been, in the employment of Ross Winans, or of any party interested in this suit. I was never employed to get up testimony in relation to any of Mr. Winans' patents. I have not, directly or indirectly, assisted in preparing or conversing with any witness or witnesses who have been or are to be examined in this case or in any of Mr. Winans' cases in relation to this patent. I have not, nor ever had, any interest, direct or indirect, in this suit, or in Winans' patents, or in any of his suits; and have never been connected in business with Ross Winans, or any of his sons.

X 80. To the eightieth cross-interrogatory. I remember that at first the flanges of the wheels of cars ran on the outside of the rails, and that they were very soon altered; but I do not recollect the date of the alteration, but think it was in 1829 or 1830, before I entered the service of the company.

X 81. To the eighty-first cross-interrogatory. I think the shortest now is fifty-six to sixty feet. What they were in 1834 I do not know.

X 82. To the eighty-second interrogatory. I never was, and am not now, in Ross Winans' employment.

X 83. To the eighty-third cross-interrogatory. I did not see, hear read, or have any knowledge of the interrogatories annexed to the Commission, until they were propounded by me to the Commissioner. I had some conversation with Charles D. Gould, and also with Mr. Wil-

liam W. Hubbell, about my knowledge on this subject, but never with Mr. Winans. I have a number of pamphlets containing affidavits and testimony, &c., in Winans' cases which were presented to me by Messrs. Gould and Hubbell; but I have read but little of them.

I do not know who all the witnesses examined on Mr. Winans' behalf are. I do not know that any of the witnesses are in his employment, except perhaps Mr. Doubleday, his foreman; whether he is a witness or not I am not certain.

X 84. To the eighty-fourth cross-interrogatory. I know nothing of the matters inquired of in this interrogatory.

X 84½. To the eighty-fourth and a half cross-interrogatory. I know nothing of such cars.

X 85. To the eighty-fifth cross-interrogatory. I do not.

X 1. To the first special cross-interrogatory to James Murray. I am a member of the firm of Murray and Hazelhurst, steam-engine builders and machinists in Baltimore.

X 2. To the second special cross-interrogatory to James Murray. I built no such cars since leaving the service of the company; but some of that description were built under my direction whilst I was superintendent of machinery. There were several of the lower traves of said springs of the same length, and there were saddles upon the springs of some.

X 3. To the third special cross-interrogatory to James Murray. I do not recollect to have made any such remark. I may have said, that, if I were to build such trucks again, I would modify and improve them in some of the minor particulars.

X 4. To the fourth special cross-interrogatory to James Murray. No. The best cars on the road are those built in the company's own shops. I do not know where the best Northern cars are built.

X 5. To the fifth special cross-interrogatory to James Murray. I have already answered said interrogatory fully, and I have no further answer to give to it.

JAMES MURRAY.

Subscribed before Levin Gale, Commissioner.

I, Levin Gale, a Commissioner named in the annexed Commission, do certify that the said James Murray was by me first carefully examined, and cautioned, and duly sworn to testify the whole truth; that he was examined in a place separate and apart from all persons, and that the interrogatories and cross-interrogatories were propounded to him and his answers taken in the order in which they are hereinbefore set forth; and that his deposition was reduced to writing by me, and thereafter subscribed by him in my presence.

I do further certify, that the examination of the other witnesses named in the Commission was not taken by me, because the said witnesses could not be produced before me and examined until after

the fifteenth day of March, in the year eighteen hundred and fifty-four; and I was informed that it was necessary to close the Commission by that day. And I do further certify, that I am not of counsel or attorney for either of the parties to the said cause, and that I am not interested in the event of the said cause.

Given under my hand and seal, this fifteenth day of March, in the year eighteen hundred and fifty-four.

LEVIN GALE.

UNITED STATES OF AMERICA, }
DISTRICT OF MASSACHUSETTS, ss. }

On the twenty-ninth and thirtieth days of September, and the sixth and seventh days of October, A. D. 1853, before me, Elias Merwin, a Commissioner duly appointed by the Circuit Court of the United States for the District of Massachusetts, personally appeared JEREMIAH MYERS, a witness for the Complainant in a certain suit in equity now pending in the Circuit Court of the United States for the District of Massachusetts, wherein Ross Winans is Complainant, and the Eastern Railroad Company are Respondents.

And now on this twenty-ninth day of September, A. D. 1853, the said Jeremiah Myers, having been by me first duly cautioned, and sworn to testify the whole truth, did depose and say in answer to interrogatories propounded by C. P. Curtis, Jr., Esq., Solicitor for the Complainant, as follows:—

Int. 1. What is your name, age, residence, and occupation; and how long have you been so engaged?

Ans. to Int. 1. My name is Jeremiah Myers; my age is fifty years; I reside in Boston, and am a machinist. I have been expressly engaged in machinery business for the last fourteen years, and in mechanical business since I was twelve years old.

Int. 2. What experience, if any, have you had as an expert in patent cases in Courts of Justice; and in what class of cases, whether mechanical or chemical?

Ans. to Int. 2. I have several times given depositions, and have several times been examined as an expert on the stand in patent causes: they have been entirely mechanical cases. I also have given a deposition in the case of Ross Winans against Orsemus Eaton *et al.* in the Northern District of New York.

Int. 3. Whether or not are you acquainted with the science of mechanics, theoretical or practical, and which? To what extent have you studied the same?

Ans. to Int. 3. I consider that I am pretty thoroughly acquainted with them practically, and that I am sufficiently acquainted with the theory to understand the principles of machinery and its construction. I have studied the same to a considerable extent.

Int. 4. Whether or not have you any experience in the comparing of mechanics, with a view to form an opinion as to their substantial ideality; and, if yea, to what extent?

Ans. to Int. 4. I have had experience of comparing two machines, for the purpose of ascertaining their identity or dissimilarity, in many cases.

Int. 5. If you were ever engaged in the manufacture of railroad cars, please state *where*, and what kinds of cars you made, and about how many in all, as near as you can remember.

Ans. to Int. 5. I have been engaged in manufacturing cars. The first I manufactured was at Attleboro', Massachusetts, and were short four-wheel cars, such as were then built. This was in 1837. The spring of 1838, I contracted for and commenced building long cars for sixty passengers each for the Lowell and Nashua Railroad. The number of four-wheel cars that I made I do not recollect; I should think from twenty to thirty in all, passenger and freight. I manufactured three long passenger-cars for the Lowell and Nashua Road, and some two or three freight-cars. These were eight-wheel cars.

Int. 6. Please state what knowledge, if any, you have respecting the first use of the railroad car of eight wheels, such as are now in common use in the vicinity of Boston. By whom were said cars built, and when and where were they used?

Ans. to Int. 6. The cars that I built were the first used in the neighborhood of Boston, as near as I recollect. About the same time that those cars were finished, two short cars were taken and spliced together, and altering the running gear for the trucks. I am not positive but what the Boston and Providence Railroad may have had one of the spliced cars running before I spliced mine. I don't know how that is.

Int. 7. Please give the dimensions of the first eight-wheel cars you made, giving the length of body, space between the bearing points of the body on the trucks, and the distance apart of the axles of the trucks.

Ans. to Int. 7. The length of the body, as near as I recollect, was about forty feet. The trucks were placed so near the end that the frame of the truck would just come within and under the end of the body. The wheels were about three inches apart from their extremity or surface. I am not positive whether the wheels were thirty or thirty-three in diameter; so that the axles were either thirty-three or thirty-six inches apart.

Int. 8. What kind of trucks had the said cars? Please describe these accurately.

Ans. to Int. 8. The trucks were built with two side-timbers having girths across the end, and a centre-beam, with braces from the corners of the truck-frame running to the centre of the beam. What we call a cup-plate, some eighteen inches in diameter, was placed in the centre of the beam, with four springs placed with the centre of them over the bearings, resting on pintles running through the frame, and resting upon the top of the box. On and within the cup-plate was fixed a bearing which was attached to the bolster of the body. Four check-

chains were attached to the body and truck at the four corners, the same as are now used to a considerable extent. But they are not so much used now as formerly, because side-bearings supersede the necessity in a great measure.

Int. 9. Where was the point of draft upon the said eight-wheel car?

Ans. to Int. 9. Upon the body.

Int. 10. From what source and at whose request did you obtain the proportions and plans to enable you to construct the said eight-wheel cars?

Ans. to Int. 10. All the information that I got of the eight-wheel cars was from the examination and measurement of some eight-wheel cars that I saw in Philadelphia. I went there and took the dimensions of and examined them at the request of Mr. Peter Clark, the agent of the Lowell and Nashua Road. Mr. Clark wished me to go and examine them, and referred me to one particular car, called the "Pennsylvania." I saw the "Pennsylvania" at Gray's Ferry.

Int. 11. What species of passenger-cars had been used prior to that time upon the railroads near Boston, and how far apart were their axles, and what was their average length?

Ans. to Int. 11. The cars generally in use were short four-wheel cars, averaging in length from twelve to eighteen feet, as near as I can recollect. Their axles were, as near as I can recollect now, from five to six feet apart.

Int. 12. What effect had the introduction of said eight-wheel passenger-cars on the use of four-wheel cars upon the railroads near Boston, and how do you know that such effect took place?

Ans. to Int. 12. I know the effect to my sorrow. The four-wheel passenger-cars were thrown entirely out of use, so much so that they could not be sold. I had some nine thousand dollars' worth of short cars on hand at the time, and could not sell them at any thing near the cost. The cars were left on my hands in consequence of the failure of the Seekonk Branch Railroad Company, and I was unable to sell them for one half the cost.

Int. 13. Please state what alterations you made in the four-wheel passenger-cars, when you joined two together to make eight-wheel cars of them.

Ans. to Int. 13. In the first place, I cut out one end from each body. I then placed plank edgeways, running the length of both bodies, at the sides, and under the seats, bolting down through the planks and through the sills of the body, also to the side-posts; attaching a bolster at a proper distance from each end, so as to conform to the length of the truck. I then cut off the frame of the car, bringing the bearings or journals of the wheels near together, and inserting a beam in the centre of the truck to receive the bolster of the body.

Int. 14. Where did you attach the draft to the car?

Ans. to Int. 14. The draft was attached to the body.

Int. 15. Have you seen the Letters Patent issued to Ross Winans, October 1, 1834, with the specification and drawing attached; and are you familiar with the same? If yea, please state whether or not,

in your opinion, they are a sufficient guide to enable one skilled in the art to which it appertains, or a railroad-carriage builder, to construct a railroad-car containing said improvements, and capable of transporting passengers with safety at the rate of twenty miles per hour? If not, wherein is it deficient?

Ans. to Int. 15. I have examined the Letters Patent issued to Ross Winans as inquired of, and the specification and drawing attached, and am familiar with the same. I think the description given is sufficient to enable any one skilled in the business to construct a car such as is inquired of.

Int. 16. Whether or not, in your opinion, would an eight-wheel car constructed according to the drawing attached to the Plaintiff's patent, as regards the truck or otherwise, exhibit the advantages and embody the characteristics of the Plaintiff's invention? If not, wherein would such car be deficient?

Ans. to Int. 16. A car built according to this drawing *would*.

Int. 17. Please to state what you consider to be the essential characteristics of the Plaintiff's improvement, and of what it consists.

Ans. to Int. 17. There are several things in this improvement over and above the old mode of building and running cars. One is the drawing from the body instead of the truck; the constructing a long body and placing a truck near each end, thus carrying the bearings of the body far from each other and near each end.

Int. 18. In what manner do you consider it essential to construct the trucks, and to place the wheels in such truck, and why?

Ans. to Int. 18. The trucks should be very strongly constructed; and, in order to derive the full benefits of the invention, the wheels should be placed as near together as they can be, and admit of the beam on which the bolster rests in the truck, because the truck in that form more readily conforms to the curvatures in the road.

Int. 19. For what purpose, or to accomplish what effect, do you understand that the two trucks should be placed at the ends of the long body?

Ans. to Int. 19. For the purpose of carrying the body more steadily on the road.

Int. 20. For what purpose is the draft to be applied to the body in place of the frame of the truck?

Ans. to Int. 20. The advantages of putting the draft on the body, instead of the truck, are that it does not cause the wheel to sheer on or against the rail, thus not creating so great friction as it would by placing the draft on the truck. The truck is left free to act upon the rail, and find its own bearing.

Int. 21. Whether or not, in your opinion, would a railroad car with eight wheels, constructed with such trucks as are specifically described in the Plaintiff's specification, be safe and proper for the conveyance of passengers at the rate of twenty miles per hour? If not, why not?

Ans. to Int. 21. It would.

Int. 22. Please state wherein the eight-wheel car made by you differed in principle and mode of operation from the car described

in the specification of the Plaintiff, and from the eight-wheel cars now in common use.

Ans. to Int. 22. The cars that I built were the same in principle as those described in the Plaintiff's specification; and, so far as the claim and specification go, they were the same as are now in common use.

Int. 23. Can you give the dimensions of the car Pennsylvania?

Ans. to Int. 23. The length of that car was forty feet, width six and a half feet. The seats were lengthwise, like an omnibus. Windows were twenty-four inches and three quarters by twenty-two inches, two lights, sash ten inches over the windows. The plank for stiffening up the sides under the seats, and also over the windows, twelve inches wide, six feet four inch posts, sides of the swell three and one half inches, the projection at the ends, being roof, two feet; trucks seven feet long, three cross-springs close together between the truck and body; the surface of the wheels three inches apart.

These are all the dimensions I have of that car.

These dimensions are given from a memorandum taken by me at the time.

The wheels, according to my recollection, were thirty-three or thirty-six inches.

Int. 24. Whether or not have you examined any eight-wheel cars used by the Defendants on their railroad? And, if yea, how many have you examined; and were they passenger or freight cars; and how many of each?

Ans. to Int. 24. I have examined cars, both passenger and freight, used on the Defendants' road; but I cannot now state the exact number. I should think I had examined ten or twelve of each, more or less.

Int. 25. Whether or not, in your opinion, were the said eight-wheel cars substantially the same as, or different from, that described in the Plaintiff's patent; and, if similar, wherein they resemble the same?

Ans. to Int. 25. I consider them the same in principle as the Plaintiff's description of cars. They resemble them in the nearness of the wheels to each other, in the distance of the trucks from each other, being placed near the ends of the body, and also the draft being from the body, the same as is claimed in the specification. These are the essential features.

Int. 26. What is the customary width of the tracks of the railroads in the vicinity of Boston?

Ans. to Int. 26. Four feet eight inches and a half.

Sept. 30, 1853. — Examination resumed.

Int. 27. Whether or not did you make examination of any four-wheel cars of the Defendants? And, if yea, whether freight-cars or not? Please state how many such cars of the Defendants you examined, and when.

Ans. to Int. 27. I examined and took measurements of seven four-

wheel passenger-cars at the depot of the Eastern Railroad Company, and three four-wheel freight cars, some three or four days since.

Int. 28. Please describe the four-wheel cars used by the Defendants, and state their dimensions, giving—1. Their length. 2. The distance apart of their axles. 3. The diameter of their wheels.

Ans. to Int. 28. The passenger-cars were old, and apparently out of use. They varied in length from fifteen feet and two inches to fifteen feet and six inches. All were six feet and one inch apart from the centre of their wheels, except two, which were six feet apart. The diameter of their wheels was thirty-three inches. The freight-cars were from fifteen feet to fifteen feet and two inches in length, two were six feet between the centre of the wheels, and one was six feet and one inch. I did not measure the diameter of their wheels.

Int. 29. Whether or not were the wheels the customary diameter, or were they larger or smaller to appearance? What is the usual size of wheels now used on railroad cars?

Ans. to Int. 29. The wheels, from their appearance, were the same as those on the passenger-cars. The wheels now commonly in use are from thirty to thirty-three inches. They do go up as high as thirty-six inches.

Int. 30. How many eight-wheel cars; and what kind, passenger or freight, did you examine on the Defendant's road?

Ans. to Int. 30. I examined seven eight-wheel passenger-cars and four eight-wheel freight-cars, some in use.

Int. 31. Please describe the said eight-wheel cars used by the Defendants, and examined by you; stating—1. Their length. 2. The distance apart of the bearing points of their bodies on the trucks. 3. The space between the axles of the trucks. 4. The distance of the trucks from the ends of the body. 5. The size of the wheels. 6. The point of draft.

Ans. to Int. 31. The bodies of the passenger-cars vary in length from thirty to fifty-one feet and ten inches. This does not include the platform. The length of the platforms I did not measure; but they are about the usual length, from two to two and a half feet each.

The distance between the two bearing points in the trucks were twenty-one feet and four inches to forty-three feet and four inches.

The distance from the end of the body, excluding the platform, to the centre of bearing on the truck, varies from four feet eight inches to four feet three inches. I noticed from my measurement, that, in the longest car, the bearing was four feet three inches from the end.

The distance of the centre of the wheels apart varied from four feet two inches to four feet six inches.

I did not measure the wheels; but they were of the usual diameter.

The point of draft was by the body, within and under the end of the body; but the precise point I cannot tell, as I did not measure.

The eight-wheel freight-cars were twenty-eight feet long.

The distance apart of the bearing points of their body on the trucks was from nineteen feet to nineteen feet ten inches.

The space between the axles of the trucks was from three feet six inches to three feet eleven inches.

The distance from ends of the body to the centre of the bearing on the truck was from four feet four inches to four feet seven inches.

The wheels were of the common size. The point of draft was by the body.

Int. 32. Whether or not have you examined any of the eight-wheel cars used on the railroads leading out of Boston, and those connected therewith, including the Defendants' road? And, if yea, upon how many different roads did such cars belong; and how recently did you make the said examination?

Ans. to Int. 32. I have examined cars at all the different depots in Boston within a few days past. The cars, according to the marks upon them, belonged to twenty-seven different roads and branches.

Int. 33. Please state how many eight-wheel cars in all you so examined, and how many of them were passenger, and how many freight-cars.

Ans. to Int. 33. I have measured in all, passenger and freight, one hundred and forty-six eight-wheel cars.

Int. 34. Whether or not did you examine any four-wheel cars and locomotive engines upon said roads? And, if yea, how many of each?

Ans. to Int. 34. I measured sixty-nine four-wheel cars, and forty-two engines.

Int. 35. If you have prepared schedules of the proportions and dimensions of the aforesaid eight-wheel cars, four-wheel cars and engines, will you annex the same to your deposition?

[The Respondents object to this, with the preceding interrogatories, in reference to dimensions of any cars, except those of Defendants, being interrogatories 32, 33, 34, and 35.]

Ans. to Int. 35. I have prepared such schedule, and produce the same to be annexed; and they are marked "A. E. M. Commissioner," by the Commissioner.

Int. 36. Please to describe the manner in which you made the said examination and measurements; whether from cars selected, or taken indiscriminately.

Ans. to Int. 36. In all cases, in going into a depot, I measured the first cars that came to hand, without regard to any particular cars. When there were a number of cars on a track, I would measure them through, and then go to another track. I would sometimes measure all the cars, and sometimes not.

Int. 37. Please to state whether or not, judging from the examination made by you of the dimensions and proportions of the cars on the Defendants' road, they are the same, or different from those cars used generally in the vicinity of Boston?

[The Respondents object to this interrogatory and the thirty-sixth interrogatory, for the reasons stated *supra*.]

Ans. to Int. 37. From the general appearance, and also from the

measurements, there is a great similarity. The general proportions and measurements are the same.

Int. 38. What, in your opinion, is the best position in which the wheels of the trucks of an eight-wheel car can be placed? How near together?

Ans. to Int. 38. In order to give an opinion, it is necessary to know facts; and, in order to answer this question, I would wish to know the condition of the road and the shortness of the radii of the curves, as it would make a material difference in the distance which the wheels should be placed apart. On a straight road, wheels may be run with safety and advantage at a greater distance apart than on a crooked road.

Int. 39. Whether or not do you consider that theoretically it is best to bring the wheels of the trucks of an eight-wheel car as near together as they can be without touching, when such car is to be used on a road with curves? Or how otherwise?

[The Respondents object to this interrogatory, as leading.]

Ans. to Int. 39. So far as my judgment goes in the placing of wheels, I should place wheels of common size as near as they can come.

Int. 40. What, in your opinion, is the best method of constructing the trucks of eight-wheel cars, so far as the distance between the axles of the wheels is concerned, when such cars are to be used on roads with curves of such radius as are usual on the railroads of New England?

Ans. to Int. 40. It was a practice adopted by me in the construction of trucks, and, so far as I have observed, has been adopted by car-builders generally, to place the wheels in the trucks as near together as possible, admitting sufficient distance for the centre-bearings. By centre-bearings, I mean the bolster on which the body rests in the truck.

Int. 41. How far is that opinion supported by the practice of car-builders, judging from the examinations and measurements made by you, and included in the said schedules?

[Respondents object to this interrogatory.]

Ans. to Int. 41. That opinion is supported by my examinations and observations of various cars; and I have almost universally found that the wheels run as near the centre-timbers of the truck as they can, and clear the centre-timbers when the trucks are made with outside-bearings. In trucks with inside-bearings upon the axles, the wheels are placed as near together as they can be and clear each other.

Int. 42. Please state to what extent, and in what cases, trucks with inside-bearings are used at the present time, and whether you examined any eight-wheel cars with trucks with inside-bearings; and how many?

Ans. to Int. 42. Eight-wheel cars with inside-bearings are but very

little used. It is very common for engine-trucks to be built with inside-bearings. My impression is, that I saw a car with inside-bearings somewhere in my examinations. I do not recollect where it was.

Int. 43. Please state whether or not there is any difference between the trucks of eight-wheel passenger-cars and those of freight-cars, so far as concerns the distance apart of the axles of the wheels? If yea, what is it? Why is it so?

Ans. to Int. 43. There is a difference. The wheels of freight-cars are, as a general thing, placed nearer together than passenger-cars; and they are so constructed from the fact that so much room is not required in the truck for the centre-timber or bearings. Freight-cars have solid frame-work for their centre-bearings; while in passenger-cars they are constructed with springs, and sometimes hanging bearings, for the purpose of giving a lateral motion to the body, requiring more room between the wheels than that in freight-cars.

Int. 44. Will you please state whether the axles of the wheels of passenger-car trucks or freight-car trucks are nearest together? And, if you shall state those of freight-car trucks are nearest together, will you state why?

Ans. to Int. 44. The axles of the wheels of freight-car trucks are, as a general thing, nearer than those of passenger-cars. That may be so from the fact that so much space is not taken up between the wheels, as in passenger-cars. I would be understood that so much space is not taken in the freight-cars as in the passenger-cars, by the centre-timber on which the body rests.

Int. 45. Why is the centre-timber of the trucks of freight and passenger-cars different?

Ans. to Int. 45. The centre-timber or bolster of the freight-car trucks are usually composed of one solid stick of timber; while in passenger-car trucks, when they are so formed as to admit of a side-motion to the body, requires three timbers in the centre of the truck. Two of them are girths, framed into the outside-frame timbers, which timbers run lengthwise of the car; the girths must be far enough apart to admit of the bolster to swing between them.

Int. 46. Do you mean to be understood, that the "three timbers in the centre of the truck," mentioned in your last answer, run lengthwise with the truck, or crosswise?

Ans. to Int. 46. I mean that they run crosswise of the truck.

Int. 47. For what purpose is the "hanging bearing" introduced into the passenger-cars, and not in freight-cars?

Ans. to Int. 47. That the body of the passenger-car may be carried more steady and easy over the road, while that is not of so much consequence in a freight-car.

Int. 48. Please describe how that lateral motion is relieved by the introduction of the three cross-timbers in the truck in place of the single bolster.

Ans. to Int. 48. The centre-timber in the truck is that on which the upper bolster rests in passenger-cars, and it is suspended by strong straps of iron, resting upon the girths, running on each side of it across the truck, and the centre-timber hangs by the straps.

Int. 49. Please state how the introduction of the three cross-bars, composing the swinging bolster, causes the wheels of the truck to be carried further apart than in the truck of freight-cars.

Ans. to Int. 49. In order to get sufficient strength, it is important that the centre-timber, or hanging bolster, should be of dimensions from eight to ten inches in width, in order to afford the strength required. The centre-timber being placed between the two girths across the truck, causes the outside of the girths to be from sixteen to eighteen inches apart; while, in the freight-car truck, the centre bearing, or bolster, is composed of a single timber of ten to twelve inches in width, and is not required to be so low in the truck-frame as in the passenger-car; thereby permitting the surface of the wheels to approach nearer to each other than in the passenger-car.

Int. 50. Why cannot the wheels in the passenger-car truck be brought as near together as in the freight-car truck, notwithstanding the swinging bolster, and although the outside of the girths are sixteen to eighteen inches apart? How does that prevent?

Ans. to Int. 50. These three cross-timbers necessarily must pass between the wheels of the truck; and as the three together are of greater width, and at the same time require to be lower in the truck-frame than in the truck-frame of the freight-car, causes the wheels to be farther apart than in the freight-car. The tops of these timbers are usually placed about on a level with the upper surface of the wheel, and, as they approach nearer the centre of the wheel, must necessarily carry the two wheels farther apart.

Int. 51. What is the usual method of placing the wheels of trucks under locomotive engines? How do they differ from the trucks of cars?

Ans. to Int. 51. The most common method, I think, in this vicinity, is placing the truck under the engine; the axles with inside-bearings, and all those that I have measured, varying from two feet ten inches to two feet eleven inches apart from the centre of the wheels.

Int. 52. Whether or not, in your opinion, is the best method of placing the wheels in the trucks of eight-wheel cars (using wheels of the usual size, thirty-three inches), in such manner that the bearing points of the wheels shall form a square? If not, why not?

Ans. to Int. 52. My opinion is, that, in the roads as they are commonly constructed in this part of the country, the wheels of common size used in the cars will run much better by being placed nearer together than four feet eight inches. This is my own judgment, and is substantiated by measurement of car-trucks of car-manufacturers generally.

Int. 53. Please state whether or not your examinations and measurements before mentioned lead you to any conclusion upon that point. And, if yea, please state what result your measurements show in that respect.

[Respondents object to this interrogatory, as assuming evidence not yet legally produced in the case, viz. measurements before objected to.]

Ans. to Int. 53. The result of my measurements is, that they are placed nearer together than four feet eight inches. The average measurement of eight-wheel passenger-car trucks, I should think, would be four feet four inches between the centres of the wheels. Four feet eight inches is the longest, and there were only seven of that distance apart out of the one hundred and forty-six which I measured. These were on the Boston and Maine Road.

And in answer to the following cross-interrogatories, propounded by William Whiting, Esq., Solicitor for the Respondents, the said Deponent further deposeth and saith:—

Cross-interrogatories.

X Int. 1. How many passenger-cars on the Maine Road did you measure?

Ans. to X Int. 1. I measured seven only. They were all four feet eight inches apart from centre to centre of the wheels.

X Int. 2. What is the principle of the eight-wheel cars?

Ans. to X Int. 2. The principle of the eight-wheel car is that by which the trucks are permitted to conform freely to the curves and inequalities of the road, and independently of the body.

X Int. 3. Would it be correct to call this the swivelling principle?

Ans. to X Int. 3. So far as the connection of the truck with the body is concerned, it may be called a swivelling principle, so far as swivelling is necessary and had.

X Int. 4. When did you leave off the manufacture of eight-wheel railroad cars?

Ans. to X Int. 4. The last that I manufactured was in the winter of 1838 and 1839.

X Int. 5. What business were you brought up to?

Ans. to X Int. 5. Carriage-business, such as wagons, chaises, coaches, and carryalls.

X Int. 6. What did you do after you left car-building in 1838-9?

Ans. to X Int. 6. I went into the machine business,—the manufacturing of machinery for cotton and wool and other business.

X Int. 7. When were you retained as an expert by the Plaintiff?

Ans. to X Int. 7. I never have been retained or acted as an expert in the Eight-wheel Car case, until the trial of the case against Eaton, Gilbert, and Co., at Cooperstown, in which I gave an affidavit.

X Int. 8. Have you seen, heard, or read, Mr. Hibbard's affidavit or testimony in that case?

Ans. to X Int. 8. I have read what purported to be a printed copy of his affidavit in that case.

Int. 9. Have you conversed with Mr. Hibbard on the subject of the Eight-wheel Car case?

Ans. to X Int. 9. I think at one time, when Mr. Hibbard and I were together, we had a little trifling conversation about the eight-wheel car, but nothing definite, that I now remember.

X Int. 10. Do you consider all eight-wheel cars with two trucks, upon substantially the same principle?

Ans. to X Int. 10. All eight-wheel cars, so constructed as to have their bearings on the truck near each end, and so attached to the truck as to give them liberty to conform to the curves of the track, would be on the same principle.

X Int. 11. Did you ever try, or see tried, any experiments with eight-wheel cars having trucks whose axes were wider apart than the gauge of the track?

Ans. to X Int. 11. I have not.

X Int. 12. Does it introduce into the eight-wheel car any change of mechanical principle or mode of operation, to substitute larger instead of smaller wheels?

Ans. to X Int. 12. If all other parts of the car or the truck are increased or diminished in proportion with the wheels, it does not alter the principle.

X Int. 13. Does it introduce into said eight-wheel car any new mechanical principle, or mode of operation, to substitute larger or smaller wheels into the trucks, all other parts remaining the same?

Ans. to X Int. 13. The introduction of larger or smaller wheels into the trucks might be carried to such an extent as to alter and destroy the use of the car upon railroads; for instance, wheels six inches in diameter would be an entire destruction of the proper proportion of the car, the other parts remaining the same; while, on the other hand, wheels ten feet in diameter would do the same. It would be a perversion of all mechanical principle and proportion, if carried to the extent I have named. The wheels may be increased or diminished in size to a certain extent, and not introduce any new mechanical principle, for instance into a truck constructed for a thirty-three inch wheel; a thirty-inch wheel might be introduced without changing the principle.

X Int. 14. Might not a twenty-inch wheel be introduced without changing the *principle*, all other things being as before?

Ans. to X Int. 14. A twenty-inch wheel might possibly be introduced into a truck constructed for a thirty-three inch wheel; but it would very much disarrange the proportions of the car. It might not materially change the principle; but it would disarrange the proper proportions of the whole structure.

X Int. 15. Might not wheels of eighteen inches in diameter be substituted, as stated, without introducing any new principle or mode of operation?

Ans. to X Int. 15. It would come just so much nearer destroying the usefulness of the article, till you got to a wheel six inches in diameter, when you would have a useless article, and would entirely destroy the principle upon which the eight-wheel car is constructed.

X Int. 16. Do you mean to be understood that the substitution of wheels, *eighteen inches* in diameter, would or would not introduce into the car any new mechanical principles of construction or operation?

Ans. to X Int. 16. I mean to be understood, that you cannot, in

any case, introduce mechanical principles to destroy mechanical proportions, as the introduction of eighteen-inch wheels into trucks constructed for thirty-three inch trucks or cars would be a destruction of the mechanical proportion, and affecting the principle to the extent of its usefulness, not perhaps destroying it.

Int. 17. Suppose three eight-wheel double truck-cars were built as follows: No. 1 has wheels four feet in diameter; No. 2 has wheels thirty-three inches in diameter; No. 3 has wheels eighteen inches in diameter; and in each case the distance of the centres of the wheels are four feet four inches apart: in all other respects, the cars are the same thing. Are such three cars constructed on the same mechanical principles and modes of operation; or will the difference in the size of the wheels make the construction and mode of operation upon different mechanical principles?

Ans. to X Int. 17. I should say that one of the three might be of natural birth: the other two would be monsters, and out of proportion. As I have said before, it is a perversion of mechanical principles. I think they are not upon the same mechanical principle.

X Int. 18. What new *mechanical principle* is introduced by the said changes in size of wheel?

Ans. to X Int. 18. I cannot answer the question more clearly.

X Int. 19. Why can you not answer the last question?

Ans. to X Int. 19. Because I can see that the destruction of mechanical proportions and principles is the introduction of a new principle.

X Int. 20. Do you mean to say, that, in passing from a truck with wheels thirty inches in diameter to wheels four feet in diameter, you destroy the mechanical principle of such truck, or of the eight-wheel car to which it is adapted?

Ans. to X Int. 20. I mean to say that it does, from the fact that a wheel four feet in diameter could not be usefully inserted in a truck designed for a thirty-three inch wheel.

X Int. 21. Suppose a car was originally built and fitted up with trucks which had wheels four feet in diameter; and suppose another car with trucks with wheels thirty-three inches in diameter, and these two cars in all other respects alike; will you compare these two cars, and say if they are constructed and operate on the same mechanical principle?

Ans. to Int. 21. The mechanical principles would be the same, leaving out of account the mechanical proportions of each.

X Int. 22. Take two cars with eight-wheel double trucks, such as are alike in every other respect, except that one has wheels thirty-three inches in diameter, and the other eighteen inches in diameter, would they be the same in mechanical principles, however different in proportions?

Ans. to X Int. 22. I would answer this the same as the last.

X Int. 23. Does the bringing the wheels nearer together or spreading them further apart in a truck, introduce any new mechanical principle in the truck; or is it a matter of proportions, to be regulated by the judgment and good sense of the car-builder?

Ans. to X Int. 23. I should say it did not alter the principle. It is to be regulated by the judgment of the builder, and adapted to the track or road upon which they are to run.

X Int. 24. Does spreading the trucks further apart or nearer together introduce any new mechanical principle, or may the position of the trucks be changed nearer or further from the end, provided the trucks are so placed as to support the weight of the body; and is not the distance of their position from the ends a matter of proportion, depending upon circumstances?

Ans. to X Int. 24. The bringing of the trucks together so far as to place the centre of the trucks one-third of the whole length of the car from each end would destroy the full principle and use of the eight-wheel car. Placing them farther apart, so far as to be without the ends of the car, and supported by a frame attached to the body, would not destroy the principle of the eight-wheel car.

X Int. 25. Would placing the trucks at any intermediate distance between the extremes mentioned in your last answer, introduce any new mechanical principle or mode of operation in the eight-wheel car?

Ans. to X Int. 25. When the trucks are placed so far apart and so near the end of the body, as to prevent the side-motion of the body, occasioned by its overhanging the truck, then it would not alter the principle of the eight-wheel car.

X Int. 26. What do you mean by the side-motion of the body occasioned by its overhanging the trucks?

Ans. to X Int. 26. I mean that when the body so far overhangs the truck, the weight being so great outside the bearing of the truck, that a side or lateral motion will be produced, that is a violation of the principle of construction of the eight-wheel car.

X Int. 27. Do you mean that there is a violation of the principle of the eight-wheel car, whenever there is lateral motion of the body of the car?

Ans. to X Int. 27. I mean that when the trucks are placed so far back from the end of the car that the weight of the body overhanging the truck causes a lateral or side motion, and also an up-and-down motion, that is a violation of the principle of the eight-wheel car.

X Int. 28. Suppose you build two eight-wheel double truck-cars — with trucks built in the same way — just alike, — in both cars the trucks are placed so that the ends of the trucks are placed just under the ends of the body; but one of these cars (No. 1) has a body forty feet long; the other (No. 2) has a body thirty feet long. Would there be any substantial difference between them in the principles of their construction and mode of operation?

Ans. to X Int. 28. If the trucks are built of proper proportions, there would be no difference.

X Int. 29. Compare car No. 2, in the last question, with a car constructed in the same manner, excepting that the body is twenty feet long; and answer the same question.

Ans. to X Int. 29. If the proportions are kept up, the principle

would be the same. There would not be any substantial difference between their principles of construction and mode of operation.

X Int. 30. Compare the car (No. 2) mentioned in the last answer, twenty feet long, with the trucks placed just under the ends of the body, with a car No. 4, which has the same trucks placed just under the end of the body, and having the body twelve feet long; please state whether these cars No. 3 and No. 4 would be constructed and would operate upon substantially the same mechanical principles and mode of operation?

Ans. to X Int. 30. The common length of trucks is about seven feet; and when we take a body as short as twelve feet, thus bringing the centre of bearings so near the centre of the body, say within six feet of each other, it would in a great measure destroy the principle of the eight-wheel car.

X Int. 31. If the trucks were not so close together as to prevent the free swivelling under the body, would car No. 4 *then* be constructed and embody the same principles of construction and operation as No. 3?

Ans. to X Int. 31. The trucks might have liberty to swivel and conform to the curves of the track; but the bearings of the body upon the truck being so near the centre of the body as not to prevent the side or lateral motion, which is an essential feature in the principle of the eight-wheel car.

X Int. 32. Suppose an eight-wheel car, constructed in the manner described in the specification, with a body supported by a frame placed beyond the ends, so that the body should be suspended between the two trucks, as suggested in one of your former answers; suppose also that the length of the body is thirty feet, and suppose another car in all respects the same, excepting that the body is twenty feet long, does or does not this diminution of the length of the body introduce into said cars any new mechanical principle or mode of operation?

Ans. to X Int. 32. Simply varying the length of the body from thirty to twenty feet, when the trucks are placed as proposed in the question, I think would not vary or destroy the principle or mode of operation, as described in the specification.

X Int. 33. Answer the same question on the supposition that the body of the longest car is twenty feet, and the shortest ten feet, in length.

Ans. to X Int. 33. The trucks are, as a general thing, seven feet in length; add to the body ten feet, making seventeen feet; then add, for the frame-work necessary to hang the body on between the trucks, a foot and a half on each end, that is, three feet, making twenty feet from the centre of bearings on the two trucks, — that would not vary in principle or mode of operation from the eight-wheel car.

X Int. 34. Answer the same question on the supposition that the body was six feet long.

Ans. to X Int. 34. If the counsel will tell me when a colt becomes a horse, I will tell him when the principle of the eight-wheel car ceases by the variation of its length. I would say that when the length is

carried so short as to destroy its utility, as I have already answered to some previous question, then it destroys the principle. By reducing the length four feet, which is the difference between ten and six, which is leaving sixteen feet to the centre of the bearings on the trucks, it might not destroy its principle, but would the general utility of the car.

X Ans. 35. Answer the same question upon the hypothesis that the body is seventy-five feet long.

Ans. to X Int. 35. If a car be built seventy-five feet in length, and made strong in proportion, the principle would be retained.

X Int. 36. Supposing the trucks to be placed *at* the ends of the body, instead of being placed beyond the ends, may not the length or shortness of body be varied to any extent, without introducing into the car any new principle of construction or mode of operation, until you have so far increased or diminished its length as to destroy its practical utility?

Ans. to X Int. 36. They might be carried to so great a length or so short a length as to destroy their utility. The variation of the length of the car is not essential to the variation of the principle, until you exceed the bounds of mechanical proportions and utility, — I would say, to the variation of the principle or mode of operation.

In answering the question, I took for granted, that the Counsel meant that the trucks were to be placed under and within the ends of the body. In the Quincy car the trucks are not under and within the ends of the body. I must say, that, if this question is not answered fully, I do not understand the meaning of language.

X Int. 37. Do you mean that such variations may or may not be made, without introducing any new principle of construction or mode of operation?

Ans. to X Int. 37. Simply the variation of the length of the body does not alter the principle or mode of operation, until you exceed all reasonable bounds. Principles in machinery cannot be laid down in feet and inches.

X Int. 38. Suppose a car having two trucks swivelling under the body, and the trucks far enough apart to swivel so as to conform to the curves of the road, the bearing points of the wheels in each truck being about as far apart as the width of the truck, and one truck being placed at each end of the body, and so arranged that it might be drawn by the body; would such a car embrace substantially the principles and mode of operation of the car described and claimed in Plaintiff's patent? If not, why not?

[The Complainant's Counsel objects to this interrogatory, because it is not sufficiently specific as to the position of the trucks and the point of draft, and the kind and size of wheels.]

Ans. to X Int. 38. A car constructed according to the supposition of this question, being drawn by the body, is substantially the same as that described and claimed in the specification of the patent.

X Int. 39. Will you state the construction of the truck in detail, using the language of the patent?

Ans. to X Int. 39. "For this purpose, I construct two bearing carriages, each with four wheels, which are to sustain the body of the passenger or other car by placing one of them at or near each end of it, in a way to be presently described. The wheels on either side of the carriage are to be placed very near each other. The spaces between their flanches need be no greater than is necessary to prevent their contact with each other. These wheels I connect together by means of a very strong spring, say double the strength employed for ordinary cars, the ends of which spring are bolted or otherwise secured to the upper sides of the boxes, which rest on the journals of the axles, the longer leaves of the spring being placed downward and surmounted by the shorter leaves. Having thus connected two pair of wheels together, I unite them into a four-wheel bearing carriage by means of their axles and a bolster of the proper length extending across, between two pair of wheels, from the centre of one spring to that of the other, and securely fastened to the top of them. The bolster must be of sufficient strength to bear a load upon its centre of four or five tons. Upon this first bolster I place another of equal strength, and connect the two together by a centre-pin or bolt passing down through them, and thus allowing them to turn or swivel upon each other in the manner of the front bolster of the common road-wagon. I prefer making these bolsters of wrought or cast iron. Wood, however, may be used. I prepare each of the bearing carriages in precisely the same way."

X Int. 40. Will you state the mode of connecting the body with the trucks, in the language of the patent?

Ans. to X Int. 40. "Upon this first bolster I place another of equal strength, and connect the two together by a centre-pin or bolt passing down through them, and thus allowing them to turn or swivel upon each other, in the manner of the front bolster of the common road-wagon."

X Int. 41. Will you give the directions for building an eight-wheel car according to the patent, and state all the passages you rely upon for each direction?

1. Length of body?

Ans. to X Int. 41. There are two different modes described of building eight-wheel cars: one is the hanging of the body upon framework between the trucks; and the other by placing the trucks under and near each end of the body. The length of the body in either case is not definitely given.

2. Size of wheels?

X Int. 42. The difference, if any, between the mode of connecting the body with the trucks shown in the specification, from the ordinary mode of connecting the body with the trucks in use at the date of Plaintiff's patent on other eight-wheel double-truck cars?

Ans. to X Int. 42. There is no definite size of wheels given in the specification. I therefore conclude from the specification, that the size of wheels commonly used in the four-wheel car were to be used in the eight-wheel car.

[The Plaintiff's counsel here objects to this interrogatory, because

the ordinary mode of connecting the body with the trucks is not stated, and because it is founded upon the assumption that such eight-wheel double-truck cars existed prior to the Plaintiff's invention.]

I think that the mode described in the specification does not vary in principle with that now in general use. What was in use at the time, or previous to the date, of the patent, I have not had the opportunity to be informed.

X Int. 43. Is any mode of draft shown or described in the specification? If so, point out the passage.

Ans. to X Int. 43. The construction of the trucks is definitely given, and so given that no way is provided or can be adapted for the draft from them. Therefore I conclude that the draft must be from the body. There is nothing in the specification that particularly describes the draft.

X Int. 44. Do you mean to say that no way can be adopted of drawing by the trucks?

Ans. to X Int. 44. I do not.

X Int. 45. Cannot the car, as described in the specification, be drawn by the trucks?

Ans. to X Int. 45. It cannot be drawn by the trucks, and retain the free motion to conform to the track, as described in the specification.

X Int. 46. Does any passage in the specification state that the draft is to be applied to the body? If so, state it.

Does any passage in the specification state that the draft is *not* to be applied to the truck? If so, state it.

Ans. to X Int. 46. I have previously stated that there is nothing definite stated as to the draft whether it should be from the body or the truck.

The inference drawn by all builders or constructors of cars would be, that the draft was from the body. There is nothing in the specification that the draft is to be from the body or from the truck; but the reasoning of the patent and the declared object would be destroyed by it.

X Int. 47. Would a car in all other respects like that described and claimed in the patent be practically useful, if the draft were from the trucks, and not from the body?

Ans. to X Int. 47. I think it would not.

X Int. 48. Why not?

Ans. to X Int. 48. Because the draft from the truck would occasion great friction while passing round curves, and make the car more liable to be thrown from the track.

X Int. 49. Is there any danger of bringing the wheels too near together in the truck, if they are small-sized, and the truck is of wide gauge?

Ans. to X Int. 49. There would be danger of bringing them very near together, having the wheels very small, and a wide gauge.

X Int. 50. What would the danger be?

Ans. to X Int. 50. The danger would be of catching upon one side

of the track, and of losing the right-angle position of the axles, and throwing the car from the track.

X Int. 51. Is it necessary to keep wheels square in the trucks, and why?

Ans. to X Int. 51. It is necessary that the wheels be kept square in the truck, because it is the only safety of keeping the car upon the track.

X Int. 52. Would a single axle, having two wheels and swivelling like the bolster of a common road-wagon, be safe if left to the guidance of the rails alone? And why not?

Ans. to X Int. 52. It would not, because there is nothing to keep the axle in a right-angle position on the road.

X Int. 53. What consequences would follow?

Ans. to X Int. 53. The body must come to the ground. When the axle turned in a line with the body, it must upset.

X Int. 54. If the wheels of a truck were brought so near together as to resemble the action of a single axle swivelling like a common road-wagon, should you judge such a truck to be safe if left without any guidance but the rails?

Ans. to X Int. 54. It would not be safe.

X Int. 55. Why not?

Ans. to X Int. 55. For the same reason that I have given in my answer to the previous questions.

X Int. 56. You have said that it is necessary that the axles of the wheels should be kept square or parallel: would you consider a truck safe in practical use, if there were no wheel-frame at all, and the axles are united together by some elastic substance?

Ans. to X Int. 56. Wheels may be united together by a substance having elasticity in a perpendicular line, while in a horizontal line they may be without elasticity, and keeping the axles in their proper position, and rendering the truck substantial and safe for all practical purposes.

X Int. 57. Suppose that the substance used would permit the axles to approach or separate from each other in actual use; would the truck then be safe?

Ans. to X Int. 57. It would depend in a great measure upon the distance they were suffered to approach, back and forth.

X Int. 58. Would such construction of trucks become dangerous, if the elasticity were such as to allow the axles of the wheels to be put out of parallelism?

Ans. to X Int. 58. The axles might to a very trifling extent, say from an eighth to a quarter of an inch, be thrown out of parallelism, and not endanger the running of the car possibly; but, if they were thrown very far out of parallel, it would be dangerous.

X Int. 59. How far must they be thrown out of parallelism in order to be dangerous?

Ans. to X Int. 59. That is a difficult question to answer. I should not wish to hazard an opinion on that.

X Int. 60. Do you not consider the truck more and more dangerous, the farther the wheels are liable to be thrown out of parallelism?

Ans. to X Int. 60. I do.

X Int. 61. Describe the truck of the locomotive now in common use, and which you measured.

Ans. to X Int. 61. I do not wish to go into a description of the truck until I have had time to reflect upon it, as there are many different varieties, as I cannot answer the question definitely. I want time to answer the question.

X Int. 62. Are you able now to give a single one of the aforesaid trucks? If yea, what truck is it?

Ans. to X Int. 62. I am not able to give any particular description of either of the trucks that I measured, as my measurement was only from centre to centre of the axles. I made no other measurement, and very little examination of the formation of the frame of the truck.

X Int. 63. Can you give a general description of any one of said trucks? If so, what can you so describe?

Ans. to X Int. 63. The truck under the fore-part of the Hinckly engine will answer as a description of the whole of the Hinckly engines with inside-bearings. The wheels from centre to centre of axles are two feet eleven inches apart, and the bearing of the engine resting upon the centre and top of springs, the ends of the springs resting upon boxes in which the axle revolves. The under side, and attached to the bottom of the box, is a frame composed of iron fastened at the four corners to the four boxes. That is the general principle of the truck. When we go above the bearings, we go into a more minute and particular description, which I am not prepared to do.

X Int. 64. Do you consider the king-bolt as a part of the truck, or is it a part of the body?

Ans. to X Int. 64. I consider it a part of the body.

X Int. 65. Do you consider the king-bolt as any part of the truck?

Ans. to X Int. 65. I do not.

X Int. 66. Did you ever try any experiments, or see any tried, in which the distance of the wheels in one truck were varied from each other, in order to show the difference in friction of the same truck in passing curves,—with the wheels at different distances from each other? If yea, state what the experiments were, where and when they were made, and who made them?

Ans. to X Int. 66. I have never tried any experiments of the kind, nor seen any tried.

X Int. 67. Is any mode of draft, and, if any, is the only mode of draft shown in the drawing, annexed to Plaintiff's patent by the middle or the end of the body?

Ans. to X Int. 67. There is no mode shown in the drawing to which there is any reference by figures or letters, and I can see nothing in the drawing which represents a mode of draft from the body.

X Int. 68. Did you ever try any experiments, or see any tried, to show the advantages of the mode of draft over another? If so, state what these experiments were.

Ans. to X Int. 68. I have not tried any, nor seen any tried, in regard

to the draft. I only judge of the advantages and disadvantages from my own knowledge of the working of cars generally.

X Int. 69. Did you never see but one mode of drawing tried?

Ans. to X Int. 69. I have never seen eight-wheel cars drawn in any other manner, except by the body.

X Int. 70. If so, how can you judge between the advantages of that mode of draft over any other that you have not seen?

Ans. to X Int. 70. I judge by general principles of the draft when applied to the body or the truck.

X Int. 71. Then you do not judge by experiments, do you?

Ans. to X Int. 71. I do not.

X Int. 72. Do locomotive trucks have upper or under bolsters?

Ans. to X Int. 72. Locomotives generally have three points of bearing. They may be called bolsters or not. I should not call them bolsters.

X Int. 73. Do locomotive trucks bear any considerable part of their weight upon the centre of the wheel-frames?

Ans. to X Int. 73. That would depend wholly on the notion of the builders, whether to put more or less weight upon the centre.

X Int. 74. How are the locomotives constructed, in point of fact, which you have measured, or seen in and about Boston in this respect?

Ans. to X Int. 74. As to the point of fact, I couldn't state.

X Int. 75. What is the length of radius of the shortest curves upon which the railroads of the United States are constructed, where they are designed for ordinary rates of travelling?

Ans. to X Int. 75. I am not sufficiently acquainted with railroad engineering to answer the question.

X Int. 76. Take a curve of a thousand feet radius, at what distance apart may the axes of the wheels in each truck be placed, without the wheels having unnecessary friction in passing such curve?

Ans. to X Int. 76. I am not sufficiently acquainted with railroad engineering to answer that question.

X Int. 77. Can you answer the question as to a curve with radius of four hundred feet; or with any other given radii?

Ans. to X Int. 77. I cannot tell definitely. I can only say that there would be more friction on a short curve than on a long one. This is the only answer I can give to this question.

X Int. 78. Can you answer the last question proposed, either theoretically or practically?

Ans. to X Int. 78. I cannot either practically or theoretically any further than I have answered it.

X Int. 79. Is there any danger in using trucks when they wobble much, and do not go steadily between the rails, taking the space for play between the flange and the rails to be as usual?

[The Plaintiff's counsel objects to this interrogatory for the reason "that it is too indefinite in the points assumed."]

Ans. to X Int. 79. In the case supposed in the question, the wab-

bling more or less would be occasioned in part by the irregularity of the track, or its deviation from a straight line, and thus making the lateral or wabbling motion dangerous to the passengers or car.

X *Int.* 80. Will not a truck be liable to wobble more (all other things being equal), the nearer the truck approaches in its construction and action to a swivelling axle with two wheels, swivelling like a common road-wagon? and how is it on curves?

Ans. to X Int. 80. When the wheels are so made, and are placed so near together, as to occasion wabbling, then it would make it dangerous and more liable to get off the track; but, when the wheels are of the proper size, they may be placed as near together as they can be, and have the flanges clear without making it dangerous, or the truck liable to get off the track.

X *Int.* 81. Will you answer the eightieth question?

Ans. to X Int. 81. A car running on a straight line, having trucks with the wheels as near together as possible, would be likely to wobble more than one with the wheels farther apart. It would be the same on curves until you extend the wheels to an improper distance.

X *Int.* 82. In your opinion, is the relief from shocks and concussions in a railroad car materially varied by diminishing or increasing the length of the body, provided the extreme ends are supported on the bearing points of the trucks?

Ans. to X Int. 82. The relief is materially increased or diminished by increasing or diminishing the length of the body.

X *Int.* 83. What was the length of the ordinary four-wheel cars in 1834 on the Baltimore and Ohio Railroad?

Ans. to X Int. 83. I do not know.

X *Int.* 84. Have you conversed with Mr. Gould or any other person as to any of the testimony you have given in this case, or as to any answer you have given since your examination commenced?

Ans. to X Int. 84. I have not.

And in answer to the following direct interrogatories resumed by C. P. Curtis, Jr., Esq., Solicitor of the Complainant, the said Depo-
nent further deposeth and saith:—

Direct Int. 1, *resumed.* Upon a truck four feet eight inches wide and with wheels of the ordinary size, as shown in the Plaintiff's drawings, can a truck be constructed with its axles sufficiently near together to make the truck resemble in action a single pair of wheels on the front axle of a common road-wagon?

Ans. to direct Int. 1. Without making the wheels so extremely small as to resemble in size the common bolster, the thing would be impossible; and that was the idea I had in answering the fifty-fourth cross-interrogatory.

Direct Int. 2, *resumed.* Do you consider that a truck whose wheels were united together with such elastic substance as is described in the specification or springs would keep the axles of the wheels sufficiently parallel or square in the trucks to prevent their running off the track, and to be practically safe and useful. If not, why not?

Ans. to direct Int. 2. Springs constructed as I have seen them constructed, and as all sensible mechanics would construct them, would be safe, and answer a practical purpose.

Direct Int. 3, resumed. Do you or not mean to be understood, that you have seen eight-wheel cars with trucks where eight wheels were united with springs in the manner described in the specification; and, if so, when and where?

Ans. to direct Int. 3. From the year 1836 to 1839, my business frequently led me to New York, Philadelphia, and Baltimore, where cars were being manufactured and used. I recollect very distinctly in Baltimore in being in an establishment where they were building the iron work of car-trucks; and I recollect very distinctly of seeing trucks put together according to the Plaintiff's specification, the axles being connected together by a spring. (I will say further, that the subject of building trucks in that manner was a subject of conversation between Mr. Peter Clark, the agent of the Lowell and Nashua Railroad, and myself; and also in reference to building them with a frame; and we finally decided upon the latter.)

[To so much of the preceding answer as is included in brackets, the Respondents' Counsel objects as not being responsive to the interrogatory, and as being incompetent evidence.]

Direct Int. 4, resumed. In what year was it that you saw the said trucks in Baltimore, as near as you can state?

Ans. to direct Int. 4. I cannot state precisely. In the spring of 1837, I went to Washington to get a patent; and, either going or returning, I stopped at Baltimore, and I think that it was one of those times. In the course of the three years between 1836 and 1839, I had business which called me to Baltimore several times.

Direct Int. 5, resumed. Have you ever seen railroad, passenger, or freight-cars with wheels revolving on the axles as in the model of the Quincy car shown you; and, if yea, how many, and where?

How extensive has been your observation?

Ans. to direct Int. 5, resumed. In the spring of 1838, I was in Philadelphia, and saw several cars on the track, and as I supposed in use, in which one wheel was fast upon the axle, and the other revolved upon the axle. These were eight-wheel passenger-cars. I am not able to say how many; there were several. I don't remember having examined cars at any other place built in that way.

Direct Int. 6, resumed. Whether or not did you ever see any other cars anywhere built in the way described in the last interrogatory,—if so, where,—excluding the Quincy cars?

Ans. to direct Int. 6, resumed. I do not distinctly recollect whether I have ever seen any other cars. I have never particularly examined any, except those mentioned in my preceding answer.

Direct Int. 7, resumed. Please examine the Plaintiff's drawing, and state what is the purpose of the ring and bolt shown thereon between the letters A and D, in the end-view of the car shown.

[The Respondents' Counsel objects to this interrogatory, "because

"it is not proper to be put on the Plaintiff's re-examination; also
"because it must be a matter of conjecture on the part of the witness;
"and the purpose entertained by the Plaintiff is immaterial, the ques-
"tion being only what it shows."]

Ans. to direct Int. 7, resumed. In examining this drawing when the question came up in the cross-examination, the particular parts representing the bolt-head and ring, also the lower end represented in the side-view, marked A, was overlooked. That I suppose to represent a draft-bolt.

Direct Int. 8, resumed. Do you mean to say side-view in your last answer?

Ans. to direct Int. 8, resumed. I do.

Direct Int. 9, resumed. Will you examine the Plaintiff's drawing, and state whether or not you wish to repeat your answer to the sixty-seventh cross-interrogatory? If not, wherein will you change it?

Ans. to direct Int. 9, resumed. In regard to the side-view, I have already answered. In reference to the end-view, I saw the same drawing that I now see, but could not tell definitely for what it was intended. I wish to change my answer to the sixty-seventh cross-interrogatory in that particular, in reference to the end-view according to the above explanation.

Direct Int. 10, resumed. What answer do you now make to the sixty-seventh cross-interrogatory?

Ans. to direct Int. 10. That I do find a draft from the end represented in the drawing.

Direct Int. 11, resumed. "From the end" of what part of the car do you find a mode of draft represented in the said drawing?

[The Respondent's Counsel objects to this interrogatory as leading.]

Ans. to direct Int. 11, resumed. From the end of the body.

Direct Int. 12, resumed. You have stated in your deposition, that prior to 1838 all passenger-cars on roads about Boston were constructed with four wheels. Will you answer how the freight-cars were constructed prior to that period as regards their length and number of wheels?

Ans. to direct Int. 12, resumed. Prior to 1838, so far as I know, all cars, passenger and freight, were four-wheel cars, in the vicinity of Boston. According to my best recollection, four-wheel cars varied in length of body, at that time, from ten to eighteen feet.

And in answer to the following cross-interrogatories, resumed by Wm. Whiting, Esq., Solicitor of the Respondents, the said Deponent further saith:—

X Int. 1, resumed. What do you mean by the word "resemble" in your answer to the first direct interrogatory resumed?

[The Plaintiff's Counsel objects to this interrogatory, "unless it refers
"to the language of the fifth-fourth cross-interrogatory."]

Ans. to X Int. 1, resumed. By the word "resemble" I mean that the thing is impossible in any other way than by making the wheels so extremely small, and placing them so near together that the base will not occupy more space on the rail than the width of the top of the bolster.

X Int. 2, resumed. What do you mean by the word "base"?

Ans. to X Int. 2, resumed. The bearing of the wheels as they rest upon the rails.

X Int. 3, resumed. Does not a truck more resemble the action of a single swivelling axle, the smaller the base is?

Ans. to X Int. 3, resumed. It does.

X Int. 4, resumed. Is a truck not more dangerous in proportion to the smallness of its base?

Ans. to X Int. 4, resumed. When its base is smaller than the proper proportions required in its use, then it is more dangerous.

X Int. 5, resumed. Where was the place, shop, or manufactory in Baltimore at which you saw the trucks made with springs; at whose establishment, and whom did you see there?

Ans. to X Int. 5, resumed. I do not now recollect. My object was to get information in relation to the building of cars, without regard to particular locality, or the name of the different establishments in that business.

X Int. 6, resumed. Can you not tell either the name of the street, the name of the shop, or the one who carried on the business, or the name of any person you saw, nor any fact or circumstance which will enable us to ascertain the place?

Ans. to X Int. 6, resumed. In the spring of 1837, I was in Baltimore, and called on Mr. Winans, I believe the Plaintiff in this case, for the purpose of explaining to him the principle of a turn-table for which I had made application for a patent, requesting him to call at the office at Washington and examine it.

In the course of conversation, the subject of the construction of cars came up. He gave me an invitation to go to a certain establishment in which he had an interest, I know not how, or in what capacity, where cars, the iron work in particular, was being constructed; referring me to a gentleman, a foreman of the shop, whose name I do not now recollect. I went and made examination, as previously stated, but cannot tell the street, or the part of the city of Baltimore.

X Int. 7, resumed. Will you describe minutely the construction of the trucks you saw there?

Ans. to X Int. 7, resumed. I cannot minutely describe them.

X Int. 8, resumed. Did you see trucks there in different states of progress?

Ans. to X Int. 8, resumed. I saw various parts of trucks, various parts of the work for constructing trucks, wheels, axles, and bolsters.

X Int. 9, resumed. How many trucks did you see of the description mentioned in your direct examination?

Ans. to X Int. 9, resumed. I cannot tell.

X Int. 10, resumed. Please answer the following inquiries as to the construction of the said trucks:—1. Were any pairs of wheels con-

nected together by means of strong springs, before the axles of the wheels were put in?

Ans. to X Int. 10, resumed. The question is beyond my comprehension.

X Int. 11, resumed. Did you see any boxes resting upon the journals of the axles?

Ans. to X Int. 11, resumed. The time has been so long since my attention having been called to the subject for many years, I decline answering any question of the kind definitely for the want of recollection.

X Int. 12, resumed. Were the ends of the springs bolted or otherwise secured to the upper side of any boxes; or did the ends of the springs play in a box, without being fastened or bolted, or otherwise secured to them?

Ans. to X Int. 12, resumed. I answer the same as to the previous question.

X Int. 13, resumed. Do you recollect seeing any springs with the longest leaves underneath?

Ans. to X Int. 13, resumed. I do not recollect of seeing any springs with the longest leaves upon the top.

X Int. 14, resumed. Do you recollect whether the longer leaves of the springs were on top or underneath?

Ans. to X Int. 14, resumed. I think I do recollect seeing springs with the longest leaf at the bottom.

X Int. 15, resumed. Had those springs any saddles or other contrivance, to keep them from being twisted?

Ans. to X Int. 15, resumed. I make the same answer as to the eleventh cross-interrogatory resumed.

X Int. 16, resumed. If you saw any bolster, what was it made of?

Ans. to X Int. 16, resumed. I make the same answer to this.

X Int. 17, resumed. Did you see any upper bolster; or only under bolsters?

Ans. to X Int. 17, resumed. I make the same answer to this.

X Int. 18, resumed. Were the springs elliptical springs?

[The Plaintiff's Counsel objects to this interrogatory, "because it does not state what kind of elliptical springs."]

Ans. to X Int. 18, resumed. I make the same answer to this.

X Int. 19, resumed. Do you recollect whether the springs were straight springs, or not?

Ans. to X Int. 19, resumed. I make the same answer to this?

X Int. 20, resumed. Do you recollect how long the springs were?

Ans. to X Int. 20, resumed. I make the same answer to this.

X Int. 21, resumed. Do you recollect whether the springs were similar in form to those shown in the drawing of Plaintiff's patent?

Ans. to X Int. 21, resumed. I make the same answer to this question.

X Int. 22, resumed. Whether or not was there any provision for keeping the truck from being twisted on the track?

Ans. to X Int. 22, resumed. I make the same answer to this.

X *Int. 23, resumed.* Do you recollect any single particular as to the construction of the truck, except what you have stated?

Ans. to X Int. 23, resumed. I do not.

X *Int. 24, resumed.* Was there any bolster which passed across between the wheels?

Ans. to X Int. 24, resumed. I make the same answer as to the eleventh cross-interrogatory resumed.

X *Int. 25, resumed.* Has there been an adjournment since the cross-examination was finished?

Ans. to X Int. 25, resumed. There has been.

X *Int. 26, resumed.* Have you seen the drawing annexed to Winan's patent, or any thing purporting to be a copy thereof, during the said adjournment?

Ans. to X Int. 26, resumed. I have not.

X *Int. 27, resumed.* Are you positive that you cannot recollect what means were used upon the said trucks to keep them from twisting?

Ans. to X Int. 27, resumed. I am.

X *Int. 28, resumed.* Did you see any king-bolt?

Ans. to X Int. 28, resumed. I answer the same as to the eleventh cross-interrogatory resumed.

X *Int. 29, resumed.* Were there or not any side-bearings?

Ans. to X Int. 29. I think there were not, as side-bearings came into use some years after.

X *Int. 30, resumed.* Were there cheek-chains? If so, for what?

Ans. to X Int. 30, resumed. I answer the same as to the eleventh cross-interrogatory resumed.

X *Int. 31, resumed.* How high above the level of the axles was the top of the lower bolster? State as near as you can.

Ans. to X Int. 31, resumed. As regards the top of the bolster, as near as I can recollect, it was about level with the top of the tread of the wheel.

X *Int. 32, resumed.* Was that bolster of iron or wood?

Ans. to X Int. 32, resumed. I answer the same as to the eighteenth cross-interrogatory resumed.

X *Int. 33, resumed.* Are you positive as to the answer to the last question but one?

Ans. to X Int. 33, resumed. I am not.

X *Int. 34, resumed.* Did you ever see either of these trucks in actual operation under an eight-wheel railroad car? If so, when and where was it used?

Ans. to X Int. 34, resumed. I recollect of seeing trucks of like form used in eight-wheel cars to those that have been described that I saw in the course of construction, and do not know that I have ever seen in use those that I saw in the course of construction.

X *Int. 35, resumed.* Where, when, and on what road, did you see said trucks you mentioned, as of like form in use?

Ans. to X Int. 35, resumed. I cannot tell precisely when or where, or upon what road, as I have no minutes to refresh my mind on that subject.

X Int. 36, resumed. Will you answer the following inquiries as to the cars mentioned by you in your thirty-fourth cross-interrogatory resumed, and which you say were like those you saw in process of construction, viz.: (a.) Did you see any boxes resting upon the journals of the axles?

Ans. to X Int. 36, resumed. I had reference, in that answer, only to the general construction, without regard to particulars, and do not now wish to go into any particulars, as I cannot recollect any particular part.

X Int. 37, resumed. In reference to the same cars mentioned in your answer to the thirty-fourth cross-question resumed, as like those you saw manufacturing, will you answer the same inquiries as are contained in the following cross-questions resumed, viz. 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22d, 23d, 24th?

[The Plaintiff's Counsel objects to this interrogatory.]

Ans. to X Int. 37, resumed. I answer these questions the same as I did those which were put in relation to the cars I saw manufacturing in Baltimore.

X Int. 38, resumed. If, as you have stated, you cannot recollect any one of these particulars of either of the trucks as inquired of, how can you with propriety undertake to compare these two trucks together, after a lapse of so many years?

Ans. to X Int. 38, resumed. My comparisons are in general terms, while my inability to recollect has reference to minute particulars.

X Int. 39, resumed. Have you stated every thing that you can recollect in general and in particular about said trucks? If not, state every thing else you have not stated, in relation to the construction of the trucks.

Ans. to X Int. 39, resumed. I have stated every thing in general and particular that I now recollect.

X Int. 40, resumed. Is there or not a necessary tendency of the flanges of wheels to come into contact with the outer rails in passing curves?

Ans. to X Int. 40, resumed. There is.

X Int. 41, resumed. Did you ever have any experience in running locomotives or cars?

Ans. to Int. 41, resumed. I have never arrived to the honor of being a railroad conductor, nor of an engineer to run a locomotive.

And in answer to the further direct interrogatories re-resumed by C. P. Curtis, Jr., Esq., Solicitor for the Plaintiff, the said Deponent further saith,—

Direct Int. 1, re-resumed. Please state what you understand elliptical springs to be, as inquired of in the eighteenth cross-interrogatory.

Ans. to direct Int. 1, re-resumed. An elliptical spring, as inquired of in that interrogatory, would be one with a curve on the under-side.

Direct Int. 2, re-resumed. What do you mean by "side-bearings," as mentioned in your answer to the twenty-ninth cross cross-interrogatory? What kind of side-bearings?

Ans. to direct Int. 2, re-resumed. I referred in that answer to bearings supported on the outer frame of the trucks, upon which the body might rest.

Direct Int. 3, re-resumed. How near together did the springs bring the wheels, and how large were the wheels in the truck you saw at Baltimore, as near as you can recollect?

[The Respondents' Counsel object to this interrogatory, because it assumes the existence of a fact which the witness has sworn he does not know.]

Ans. to direct Int. 3, re-resumed. From the indistinct recollections that I have of the cars or trucks, I do not wish to give an opinion in regard to the size of wheels, or their distance apart. All that I can say is, that they were pretty near together.

Direct Int. 4, re-resumed. Have you conversed with any one since your cross-examination was finished in relation to your testimony?

Ans. to direct Int. 4, re-resumed. I have not.

And in answer to the following cross-interrogatories resumed by Wm. Whiting, Esq., Solicitor for the Respondents, the said Depo-
nent further saith,—

X X *Int. 1, resumed.* Can you undertake to say that the bearing points of the wheels were brought nearer together than as represented upon the model exhibited to you as that of Winans, and marked by the Commissioner? If so, how much?

Ans. to X X Int. 1, resumed. I should think the bearing points of the wheels were nearer together than in the model referred to. According to the proportion of the wheels in the model, the flanges would be seven inches and a half apart, or thereabout, while the flanges in the cars that I saw were nearer, as near as I can recollect; say within three inches.

X X *Int. 2, resumed.* Are you positive as to your recollection of the distance of the wheels?

Ans. to X X Int. 2, resumed. I am not positive, as I have before stated.

JERH. MYERS.

UNITED STATES OF AMERICA, }
DISTRICT OF MASSACHUSETTS, ss. }

I, ELIAS MERWIN, a Commissioner duly appointed by the Circuit Court of the United States for the District of Massachusetts, under and by virtue of the "Act for the more convenient taking of affidavits and bail to be used in civil causes depending in the courts of the United States," passed February 20th, 1812, and the Acts in addition thereto, do hereby certify, that the time and place for taking the foregoing deposition were agreed upon by the parties in the caption of said deposition named; that on the 29th and 30th days of September, and the 6th and 7th days of October, A.D. 1853, I was attended by C. P. Curtis, Jr. Esq., Solicitor of the Complainant, by William Whiting, Esq., Solicitor of the Respondents, and by the said witness; and the said witness was by me first carefully examined, and cautioned, and sworn, to testify the whole truth; and the testimony by him given was by me reduced to writing, and was thereafter subscribed by the said witness in my presence; and that I am not of counsel or attorney to either of the parties, nor in any way interested in the event of the cause in the said caption named.

ELIAS MERWIN, *U. S. Commissioner.*

[A. — E. M. Comm.]

Measurements of Cars and Engines used on Twenty-seven Railroads and Branches at Depots in Boston by Jeremiah Myers, many being loaded and attached to Engines.

EIGHT-WHEEL CARS	146
FOUR-WHEEL CARS	69
SIX-WHEEL CARS	1
LOCOMOTIVES, having a Truck under forward end	42

Cars and Locomotive Engines on the Eastern Railroad.

CARS AND LOCOMOTIVE ENGINES.		Length of Body within Platform.		Distance between Bearing-points of Body on Trucks.		Distance of Bearings from end of Body.		Distance between Truck-axes.	
		ft.	in.	ft.	in.	ft.	in.	ft.	in.
Passenger Car		41	6	32	2	4	8	4	5
" "		41	3	36	11	4	8	4	5
" "		42	4	33	6	4	5	4	4
" "		51	10	43	4	4	3	4	6
" "		43	4	34	10	4	4	4	2
Two Passenger Cars		30	3	21	9	4	5	4	2
Average		42	0	33	8	4	5	4	4*
Six-wheel Truck		51	10	35	10	8	0	3	6
Four Freight Cars		28	0	18	10	4	7	3	11
Three Freight Cars		28	0	19	0	4	6	3	6
Four old Four-wheel Passgr. Cars (33-inch wheels)		15	4	.	.	.	.	6	1
Three old " " " " " "		15	6	.	.	.	.	6	0
Three Four-wheel Freight Cars		15	0-2	.	.	.	.	6	0
Locomotive Engine Bryant . . . . .		.	.	.	.	.	.	2	11
" " Witch . . . . .		.	.	.	.	.	.	2	8
" " Ironsides . . . . .		.	.	.	.	.	.	2	8
" " Magnolia . . . . .		.	.	.	.	.	.	2	9
" " Rough and Ready . . . . .		.	.	.	.	.	.	2	9
" " Portsmouth . . . . .		.	.	.	.	.	.	2	11
" " Danvers . . . . .		.	.	.	.	.	.	2	10
" " Express . . . . .		.	.	.	.	.	.	2	10
" " Traveller . . . . .		.	.	.	.	.	.	2	9
" " Huntress . . . . .		.	.	.	.	.	.	2	11
" " Salem . . . . .		.	.	.	.	.	.	2	9
" " Portland . . . . .		.	.	.	.	.	.	2	11
Average distance between axles in Trucks under Locomotive Engines in use on Road . . . . .		.	.	.	.	.	.	2	9

* Between outer wheels in each truck, 12ft. 4in.

Boston and Providence Railroad. — New Bedford and Taunton Branch Railroad.

CARS AND ENGINES ON TWO RAILROADS.		Length of Body within Platform.		Distance between Bearing-Point of Body on Trucks.		Distance of Bearings from end of Body.		Distance between Truck-axes.	
<i>Boston and Providence Railroad.</i>									
Passenger Car	.	.	.	.	.	ft.	in.	ft.	in.
"	"	.	.	.	.	41	5	32	8
"	"	.	.	.	.	49	8	40	2
"	"	.	.	.	.	46	3	35	5
"	"	.	.	.	.	41	0	31	0
<i>New Bedford and Taunton Branch Railroad.</i>									
Passenger Car	.	.	.	.	.	ft.	in.	ft.	in.
"	"	.	.	.	.	41	8	32	2
"	"	.	.	.	.	41	0	31	4
"	"	.	.	.	.	43	1	32	9
"	"	.	.	.	.	43	2	34	0
Bag and Mail Car	.	.	.	.	.	44	3	35	1
Stonington Passenger Car	.	.	.	.	.	45	1	34	6
"	"	.	.	.	.	47	7	37	9
Six-wheel Baggage Car	.	.	.	.	.			4	11
Freight Car	.	.	.	.	.	28	0	20	0
"	.	.	.	.	.	28	2	19	6
"	.	.	.	.	.	28	1	19	5
"	.	.	.	.	.	28	0	19	8
"	.	.	.	.	.	26	0	15	0
"	.	.	.	.	.	25	7	16	0
"	.	.	.	.	.	25	8	17	0
"	.	.	.	.	.	25	5	16	9
Four-wheel Freight Car	.	.	.	.	.	11	3	4	4
Locomotive Engine Bristol	.	.	.	.	.
"	"	Blackstone	.	.	.				
"	"	Neponset	.	.	.				

CARS AND ENGINES ON BOSTON AND MAINE RAILROAD.		Length of Body within Platform.	Distance between Bearing-points of Body on Trucks.	Distance of Bearings of Body from end of Body.	Distance between Truck-axes.
		ft. in.	ft. in.	ft. in.	ft. in.
Passenger Car		38 10	28 8	5 1	4 8
" "		38 10	28 8	5 1	4 8
" "		42 9	33 9	4 6	4 8
" "		36 8	25 2	4 9	4 8
" "		40 9	30 11	4 11	4 8
" "		28 6	18 2	5 2	4 8
Mail Car		45 7	35 5	5 1	4 8
Freight Car		28 0	19 10	4 1	4 1
"		28 0	19 10	4 1	4 1
"		28 0	19 10	4 1	4 5
"		27 6	19 4	4 1	4 5
"		27 9	17 7	4 1	4 3
Fourteen Four-wheel Freight Cars		12 & 13	.	3 0	6 1
				3 6	6 0
Engine Ogochook,	with Trucks	.	.	.	2 11
" Lawrence,	"	.	.	.	2 10
" New Hampshire,	"	.	.	.	2 10
" Portland,	"	.	.	.	2 11
" Vermont,	"	.	.	.	2 10
" Antelope,	"	.	.	.	2 11
" Essex,	"	.	.	.	2 10
" Augusta,	"	.	.	.	3 1
" Hinkley,	"	.	.	.	2 8
" Cochecho,	(outside bearings)	.	.	.	3 6
" Boston,	"	.	.	.	2 11

Lowell and Boston Railroad.

CARS ON LOWELL AND BOSTON RAILROAD.					Length of Body within Platform.		Distance between Bearing-points of Body on Trucks.		Distance of Bearings from end of Body.		Distance between Truck-axes.	
					ft.	in.	ft.	in.	ft.	in.	ft.	in.
Passenger Cars					43	0	33	2	4	11	4	5
" "					42	9	32	9	5	0	4	7
" "					43	2	33	4	4	10	4	5
" "					43	10	34	0	4	10	4	6
Freight Car					28	0	18	2	4	7	4	2
" "					27	10	18	0	4	7	4	1
" "					28	3	18	11	4	8	4	1
Ten Four-wheel Freight					12	7to9	.	.	.	}	7	to
One Four-wheel Baggage					13	0	.	.	.	.	6	9

Nashua Railroad. — Northern Railroad.

KIND OF CARS ON TWO RAILROADS.					Length of Body within Platform.		Distance between Bearing-points of Body on Trucks.		Distance of Bearings from end of Body.		Distance between Truck-axes.	
Nashua Railroad.					ft.	in.	ft.	in.	ft.	in.	ft.	in.
Baggage Car .					21	1	12	11	4	1	3	10
Passenger Car .					43	10	33	10	5	0	4	2
" "					44	1	35	9	4	10	4	2
Freight Car					38	0	29	4	4	4	3	8
" "					32	0	21	10	5	1	3	8
" "					29	0	20	2	4	10	3	10
Northern Railroad.												
Freight Car .					27	7	18	7	4	6	4	0
" "					27	0	18	4	4	4	4	0
" "					27	6	18	6	4	6	4	2
" "					28	0	20	4	4	4	4	1
One Four-wheel Freight Car					12	0	.	.	.	.	5	11
" "					12	2	.	.	.	.	5	10

Boston and Worcester Railroad.—Western Railroad.

KIND OF CARS ON TWO RAILROADS.		Length of Body within Platform.	Distance between Bearing-points of Body on Trucks.	Distance of Bearings from end of Body.	Distance between Truck-axes.
		ft. in.	ft. in.	ft. in.	ft. in.
<i>Boston and Worcester Railroad.</i>					
Passenger Car		30 3	20 3	5 0	4 6
" "		41 3	31 5	4 11	4 6
" "		41 2	31 2	5 0	4 5
" "		30 5	20 7	4 11	4 1
" "		40 0	31 0	4 6	4 1
Freight Car		25 4	26 4	4 6	4 0
"		25 4	16 10	4 3	4 0
"		25 6	16 6	4 6	4 0
"		25 6	16 6	4 6	4 0
"		27 5	18 5	4 6	3 10
Four-wheel Freight Car		12 6	. .	. .	6 1
" " "		12 8	. .	. .	6 0
" " "		12 6	. .	. .	6 1
<i>Western Railroad.</i>					
Mail Car		40 0	31 0	4 6	4 1
Passenger Car		45 0	35 0	5 0	4 6
" "		47 0	36 6	5 3	4 6
" "		43 0	33 0	5 0	4 8
Freight Car		24 8	16 2	4 3	3 11
"		24 5	16 0	4 0	3 10
"		27 6	18 10	4 4	3 11
"		25 4	16 4	4 6	4 0
Four-wheel Freight Car		12 6	. .	. .	6 1

Worcester and Western Railroad. — New York and New Haven Railroad. — Connecticut Railroad. — Norwich and Worcester Railroad.

ENGINES AND CARS ON FOUR RAILROADS.		Length of Body within Platform.	Distance between Bearing-points of Body on Trucks.	Distance of Bearings from end of Body.	Distance between Truck-axes.
		ft. in.	ft. in.	ft. in.	ft. in.
<i>Worcester and Western Railroad.</i>					
Engine	N. Hale . . . . .	. .	. .	. .	2 10
"	Brookline . . . . .	. .	. .	. .	2 10
"	Falcon . . . . .	. .	. .	. .	2 10
"	Hecla (B. & W.) . . . . .	. .	. .	. .	2 10
"	Elephant . . . . .	. .	. .	. .	2 10
"	Yankee . . . . .	. .	. .	. .	2 10
"	Niagara . . . . .	. .	. .	. .	2 10
<i>New York and New Haven Railroad.</i>					
Freight Car	. . . . .	25 0	17 10	3 7	3 8
"	"	25 0	17 4	3 10	3 9
"	"	27 0	20 0	3 6	3 8
<i>Connecticut Railroad.</i>					
Freight Car	. . . . .	26 0	18 0	4 0	3 10
"	"	27 0	19 0	4 0	3 10
"	"	28 0	20 0	4 0	3 11
<i>Norwich and Worcester Railroad.</i>					
Freight Car	. . . . .	27 6	19 2	4 2	3 10
"	"	28 0	20 0	4 0	3 11
"	"	28 0	19 8	4 2	4 0

CARS AND ENGINES ON OLD COLONY RAILROAD.										Length of Body within Platform.	Distance between Bearing-points of Body on Trucks.	Distance of Bearings from end of Body.	Distance between Truck-axles.
										ft. in.	ft. in.	ft. in.	ft. in.
Passenger Car	39 7	29 7	5 0	5 1
" "	40 0	31 4	4 10	4 2
" "	40 6	32 4	4 8	4 2
Freight Car	27 0	18 11	4 1	3 11
" "	28 0	19 10	4 2	3 10
" "	27 0	18 11	4 1	3 10
Engine Weymouth	2 10
" John Eliot	2 10
" Patuxet	2 11
" J. Q. Adams	2 11
" Kingston	2 11
" Quincy	2 11

Vermont Central Railroad. — Concord Railroad. — Concord and Claremont Railroad. — New Hampshire Central Railroad.

KIND OF CARS ON FOUR RAILROADS.		Length of Body within Platform.	Distance between Bearing-points of Body on Trucks.	Distance of Bearings from end of Body.	Distance between Truck-axes.
		ft. in.	ft. in.	ft. in.	ft. in.
<i>Vermont Central Railroad.</i>					
Freight Car		28 2	19 6	4 4	4 0
" "		27 9	18 9	4 6	4 1
" "		23 1	19 3	4 5	4 1
" "		23 0	19 2	4 5	4 1
" "		27 6	18 6	4 6	4 0
<i>Concord Railroad.</i>					
Freight Car		35 0	26 8	4 2	4 2
" "		34 0	26 0	4 0	4 0
" "		34 0	25 10	4 1	4 1
" "		28 0	20 2	3 11	3 9
Four-wheel Car		12 6	. .	. .	5 11
<i>Concord and Claremont.</i>					
Freight Car		23 0	19 4	4 4	4 0
" "		23 0	19 4	4 4	4 1
" "		23 0	19 4	4 4	4 1
Four-wheel Car		13 0	. .	. .	6 0
<i>New Hampshire Central Railroad.</i>					
Freight Car		23 0	19 4	4 4	4 1
" "		23 0	19 8	4 2	4 0
" "		23 0	19 10	4 1	4 1
Two Four-wheel Cars	}	12 & 12 3	}	. .	6 0

Passumpsic Railroad. — Manchester and Lawrence Railroad. — Ogdensburgh Railroad. — New Haven, Hartford, and Springfield Railroad. — Nashua and Lowell Railroad.

KINDS OF CARS ON FIVE RAILROADS.		Length of Body within Platform.		Distance between Bearing-points of Body on Trucks.		Distance of Bearings from end of Body.		Distance between Truck-axles.	
		ft.	in.	ft.	in.	ft.	in.	ft.	in.
<i>Passumpsic Railroad.</i>									
Freight Car	.	28	0	19	4	4	4	4	1
" "	.	28	0	19	4	4	4	4	1
" "	.	28	0	19	4	4	4	4	1
Four-wheel Freight	.	12	7	.	.	.	.	5	10
" "	.	12	0	.	.	.	.	5	10
<i>Manchester and Lawrence Railroad.</i>									
Freight Car	.	40	0	30	0	5	0	4	2
" "	.	30	0	20	2	4	10	4	1
" "	.	30	0	20	8	4	8	4	0
" "	.	35	0	26	0	4	6	4	2
<i>Ogdensburgh Railroad.</i>									
Freight Car	.	28	2	20	0	4	4	4	1
" "	.	27	8	19	8	4	2	4	0
" "	.	28	0	19	4	4	4	4	0
<i>New Haven, Hartford, and Springfield Railroad.</i>									
Freight Car	.	27	6	18	4	4	5	3	11
" "	.	27	4	18	6	4	5	3	10
" "	.	28	0	19	2	4	5	3	10
<i>Nashua and Lowell Railroad.</i>									
Freight Car	.	38	0	29	4	4	4	3	8
" "	.	22	0	21	10	5	1	3	2
" "	.	38	0	29	4	4	4	3	8

*Fitchburg Railroad.—Vermont and Massachusetts Railroad.—Portland,
Saco, and Portsmouth Railroad.*

CARS AND ENGINES ON THREE RAILROADS.	Length of Body within Platform.		Distance between Bearing-points of Body on Trucks.		Distance of Bearings from end of Body.		Distance between Truck-axes.	
	ft.	in.	ft.	in.	ft.	in.	ft.	in.
<i>Fitchburg Railroad.</i>								
Passenger Car	32	2	22	4	4	10	4	1
Two Passenger Cars	40	3	29	0	4	2	4	1
Two Passenger Cars	41	2	30	6	5	4	4	3
Passenger Car	41	2	32	8	4	3	4	1
Passenger Car	41	2	32	8	4	3	4	3
Freight Car	32	2	22	4	4	10	4	0
Two Freight Cars	38	0	27	0	5	6	4	4
Three " "	41	2	30	6	5	4	4	4
Two " "	40	0	31	8	4	2	4	0
Two Four-wheel Freight Cars	12	0	.	.	.	.	6	10
Four-wheel Freight Car	12	6	.	.	.	.	6	6
Engine Charlestown . . . . .	.	.	.	.	.	.	2	10
" " under tender . . . . .	.	.	.	.	.	.	3	3
<i>Vermont and Massachusetts Railroad.</i>								
Two Freight Cars	29	0	20	8	4	2	4	0
Freight Car	28	0	19	8	4	1	4	0
Two Freight Cars	29	0	20	10	4	1	4	1
<i>Portland, Saco, and Portsmouth Railroad.</i>								
Two Freight Cars	39	11	30	11	4	6	4	0
Freight Car	39	0	31	0	4	7	4	0
" "	30	0	21	9	4	5	4	1
" "	37	0	26	10	4	1	4	0

UNITED STATES OF AMERICA.

[L. S.]

THE CIRCUIT COURT OF THE UNITED STATES, WITHIN AND FOR THE MASSACHUSETTS
DISTRICT.

MASSACHUSETTS DISTRICT, ss.

To John Freeman, of Washington, County of Washington, Pennsylvania, Associate Justice of the Court of Common Pleas, Washington County, Pennsylvania.

Know ye, that, reposing confidence in your wisdom, prudence, and fidelity, we have appointed, and by these presents do authorize and empower, you to take the answers to the interrogatories hereunto annexed, of Jonathan Knight, of East Bethlehem, in the District of Pennsylvania, a witness to be examined on behalf of the Plaintiff, and to be used in a certain cause now pending in said Court, wherein Ross Winans is Plaintiff, *vs.* The Eastern Railroad Company, Defendants, in equity.

And to this end, at certain days to be by you appointed for that purpose, to cause said witnesses, as aforesaid, to be brought before you, and each witness, while present before you, to examine carefully on oath touching the premises. And, when you shall have taken the examination as aforesaid, to reduce or cause the same to be reduced to writing, and to be subscribed by each of said witnesses in your presence; and the same, so taken and subscribed, to return, together with this Commission and your doings herein, enclosed, sealed, and directed to the Circuit Court aforesaid, now holden at Boston.

In testimony whereof, we have caused the seal of the said Circuit Court to be hereunto affixed.

Witness, the Honorable Roger B. Taney, at Boston, this twenty-fifth day of May, in the year of our Lord one thousand eight hundred and fifty-three.

H. W. FULLER, *Clerk.*

N. B. — You shall not, except by consent of the parties in writing, permit either party to attend at the taking of the deposition, either himself, or by any attorney or agent, nor to communicate by interrogatories or suggestions with the Deponent whilst giving his deposition in answer to the interrogatories annexed to this commission. And you shall take such deposition in a place separate and apart from all other persons, and permit no person to be present during such examination, except the Deponent and yourself, and such disinterested person (if any) as you may think fit to appoint as a clerk, to assist you in reducing the deposition to writing. And you shall put the several interrogatories and cross-interrogatories to the Deponent in their order, and take the answer of the Deponent to each, fully and clearly.

[Depositions to be taken on paper of like size with this Commission.]

UNITED STATES OF AMERICA.

[L. S.]

THE CIRCUIT COURT OF THE UNITED STATES, WITHIN AND FOR THE MASSACHUSETTS
DISTRICT.

MASSACHUSETTS DISTRICT, ss.

*To John Carrere, or John Hanan, of Baltimore, in the District of
Maryland, Esquire, United States Commissioners.*

Know ye, that, reposing confidence in your wisdom, prudence, and fidelity, we have appointed, and by these presents do authorize and empower, you to take the answers to the interrogatories hereunto annexed, of Philip E. Thomas, Evan Thomas, George Brown, William Woodville, Thomas Davis, John Ferry, Edward Ferry, William Roberts, David Steiner, George Rohrer, William Fairbank, Gustavus V. Allen, William H. McCannon, William Dempsey, William Hughes, William G. Miller, John D. Wheeler, John Elgar, Benjamin H. Latrobe, James P. Stabler, Caspar W. Wever, Caleb B. Moore, George Matthews, John D. Steele, Samuel J. Wilder, Samuel Brook, and Oliver Cromwell, all of Baltimore, in the District of Maryland; and of Michael L. Glenn, of Easter Neck Island, in Kent County, in said District of Maryland, witnesses to be examined on behalf of the Complainant, and to be used in a certain cause now pending in said Court, wherein Ross Winans is Plaintiff, *vs.* The Eastern Railroad Company, Defendants, in equity.

And to this end, at certain days to be by you appointed for that purpose, to cause said witnesses, as aforesaid, to be brought before you; and each witness, while present before you, to examine carefully on oath touching the premises. And, when you shall have taken the examination as aforesaid, to reduce or cause the same to be reduced to writing, and to be subscribed by each of said witnesses in your presence; and the same, so taken and subscribed, to return, together with this Commission and your doings herein, enclosed, sealed, and directed to the Circuit Court aforesaid, now holden at Boston.

In testimony whereof, we have caused the seal of the said Circuit Court to be hereunto affixed.

Witness, the Honorable Roger B. Taney, at Boston, this thirty-first day of May, in the year of our Lord one thousand eight hundred and fifty-three.

H. W. FULLER, *Clerk.*

N. B. — You shall not, except by consent of the parties in writing, permit either party to attend at the taking of the depositions, either himself, or by any attorney or agent, nor to communicate by interrogatories or suggestions with the Deponents whilst giving their depositions in answer to the interrogatories annexed to this commission. And you shall take such depositions in a place separate and apart from all other persons, and permit no person to be present during such examination, except the Deponents and yourself, and such disinterested

person (if any) as you may think fit to appoint as a clerk, to assist you in reducing the depositions to writing. And you shall put the several interrogatories and cross-interrogatories to the Deponents in their order, and take the answer of the Deponents to each, fully and clearly.

[Depositions to be taken on paper of like size with this Commission.]

UNITED STATES CIRCUIT COURT, }
MASSACHUSETTS DISTRICT, — October Term, 1852. }

ROSS WINANS vs. THE EASTERN RAILROAD COMPANY,

IN EQUITY.

Interrogatories to John Elgar, Benjamin H. Latrobe, both of Baltimore; Jonathan Knight, of East Bethlehem, Pennsylvania; James P. Stabler, Casper W. Wever, Caleb B. Moore, George Matthews, John D. Steele, Samuel I. Wilder, and Samuel Brook, of Baltimore; on behalf of the Plaintiff.

1. What is your name, age, residence, and occupation or profession; and how long have you been so occupied, and where?

2. Were you at any time, and during what period, employed by or connected with the Baltimore and Ohio Railroad Company? If yea, in what position or capacity; and during what years?

3. Do you know the Complainant, Ross Winans? And, if you know him in the employ of the said railroad, please state during what years you so knew him, and in what capacity he was employed.

4. Please describe the manner in which the business of the said company was conducted by its different officers, and state whether the duties of its several agents were general or specific, and state the system followed, by which the directors became cognizant of the progress of the affairs of the company, or of the work done by its agents and officers upon the road and in the shops of the company.

[Objected to, as leading and as implying or expressing facts not stated by the witnesses, and as irrelevant and immaterial.]

5. Please state what degree of advancement civil engineering had made in this country, and what degree of experience American engineers were possessed of generally, at the time when the said railroad was commenced; what other railroads were then in operation in this country, if any; and what measures were taken by the engineers of the said road to gain information respecting the subject of railroads.

[The first part of the question is objected to, as inquiring into the state of the science of civil engineering in general, embracing a vast variety of subjects that can have no relation to the subject of railroads or railway cars. But the question is irrelevant, however stated; and the

experience of other engineers, except the witnesses, can be proved only by calling such engineers as witnesses.]

6. Whether or not the said Baltimore and Ohio Railroad was constructed in a manner differing from the railroads then in operation; please to state in what particulars, and the causes and the reasons for such differences.

7. If you say that said road was built in any manner differing from other railroads in operation at its commencement, please state whether or not such machinery or running gear as were then in general use upon other railroads were competent for use upon said road, or whether modifications were necessary to adapt the same to the said road. If yea, please state what such modifications were.

8. Whether or not any experiments in regard to the adaptation or alteration of such machinery were made upon said road by any one; and, if yea, what were they; under whose direction, by whom, and during what period of time, were they made?

9. When, and for what species of transportation, whether passengers or freight, was the first eight-wheel car placed upon the said railroad? By what name was it designated; and by whom, or under whose direction, was it constructed?

10. Whether or not was the said car considered a novelty? and if yea, by whom, and in what particular?

[Objected to as a mere hearsay, and as inquiring into a mere opinion, and as immaterial and irrelevant.]

11. Please examine the drawing annexed, marked "Car Columbus" (see drawing so marked), and state whether or not it represents the said first eight-wheel car? If not, in what does it differ therefrom?

[Objected to as leading.]

12. Please state whether or not other cars were constructed upon the plans and proportions of the said car Columbus; and, if yea, how many? If not, why not?

13. In what year, and when, was the Washington branch of said railroad first opened for use?

14. Please state what you know relative to the construction of other eight-wheel cars for said road, prior to the opening of the said Washington branch;—by whom they were designed and constructed, for what kind of transportation they were used, and how they differed from each other, and the reasons for such differences, and how they were severally designated.

15. Please look at the drawing hereto annexed, marked "Car Dromedary" (see drawing), and state what it purports to represent, and whether or not it is a true representation thereof; and, if not, wherein does it differ?

[Objected to as leading.]

16. Please examine the drawing annexed, marked "Car Comet"

(see drawing), and state what it purports to represent, and whether or not it is a true representation thereof. If not, wherein does it differ?

[Objected to as leading.]

17. What experiments were necessary, if any, to obtain the proportions and mode of construction of the eight-wheel cars now in common use, after the said car Columbus was made; and by whom were said experiments conducted?

18. Whether or not you know of any cars called "Washington cars" on said railroad? If yea, when and where were said cars first built and used? By whom were they designed or constructed?

19. Please describe said Washington cars, and state wherein they differed from the other eight-wheel cars made prior thereto. Wherein did they differ from those now in common use?

20. When were eight-wheel freight-cars first used on said railroad?

21. Who was spoken of and commonly known as the inventor of the eight-wheel cars used on said road, and whom do you believe to have been the inventor thereof? Please state the grounds for your belief.

[Objected to as hearsay, also because the witnesses cannot legally be inquired of as to their belief. The grounds of belief cannot be stated, excepting they be facts within the personal knowledge of witnesses.]

22. Please state the advantages possessed by the "eight-wheel car" over a four-wheel car, and in what manner such superiority manifests itself. Describe all, fully.

23. When, if at any time, did you first learn that it was the intention of the Complainant to apply for Letters Patent for the said "eight-wheel car"?

[Objected to as inquiring as to the intentions of Plaintiff, and as introducing hearsay, and as introducing statements of Plaintiff, and as irrelevant.]

24. Have you examined the Letters Patent and specification annexed, issued to the Complainant, Ross Winans, dated October 1st, 1834, for an "Improvement in the construction of cars or carriages for railroads"? If not, please examine the specification hereto annexed, and state whether or not in your opinion the same is a sufficient guide to enable one skilled in the art to which it appertains to construct a car containing said improvement, suitable for the transportation of passengers or freight at the customary speed of twenty miles per hour. If not, wherein is it deficient?

[Objected to, inasmuch as the said specification annexed is not a true copy of said Winans' specification in his said patent, but contains matters not in said specification and patent. The drawing marked A. is also objected to as containing statements of facts, and the questions as leading.]

25. Whether or not, in your opinion, would a car constructed according to the drawing forming part of said Letters Patent (a copy whereof is hereto annexed), marked A., exhibit the advantages claimed to be given by the improvement described in the text of the specification aforesaid? Please state what knowledge or experience you have had, which enables you to express such opinion.

[Objected to as leading, and for the same reasons as the last question.]

26. Whether or not do the eight-wheel cars in general use conform to the description in said Letters Patent? And if not, wherein do they differ?

[Objected to as irrelevant.]

27. What do you regard as the novelty secured to the Complainant by said Letters Patent?

[Objected to as inquiring witnesses' opinions on the construction of Plaintiff's claims in his patent.]

28. What is it that regulates the comparative length of body and distance between the axles of four-wheeled cars as used on railways?

29. Is there any position of the axles of a four-wheel car which causes the load to be carried with the least disturbance and greatest steadiness? If yea, please state what it is.

30. Who determined the proportions of the four-wheel cars used on the said Baltimore and Ohio Railroad? What was the length of their bodies? What size were their wheels, and at what distance apart were their axles? And why were these proportions so fixed?

31. What was the minimum radius of curve on the said road? And what was the weight per lineal yard of the rails on said road?

32. What was the average weight per yard of rails used on other railroads at the time of or before the commencement of the said railroad?

33. [*De bene esse.*] Did you know Canduce Gatch in the service of the said company? If yea, in what manner was he brought into the service of the said company, and what was his position and duty in their service?

34. [*De bene esse.*] Whether or not had the said Gatch, while you were connected with the said company, authority to order to be constructed or to construct cars of other kinds or proportions than such as had been designated and ordered by the engineers of said company? And, if yea, during what time had he such authority, and to what extent?

35. [*De bene esse.*] Have you examined the specification and drawing of Letters Patent issued to William and Edward Chapman, of the County Durham, England, for a method or methods of facilitating the means and reducing the expense of carriage on railways and other roads, dated Dec. 30th, 1812, published in the 24th vol. of the Repertory of Arts, Manufactures, and Agriculture, second series, London, 1814, on pp. 129 to 142, inclusive? If not, please examine

the same, and state whether or not said specification and drawing describe a railroad car such as is described in the Letters Patent issued to the Complainant, Oct. 1st, 1834. If yea, please state in what part of said specification and drawing you find the same described. If not, state the distinctive differences between the two.

36. [*De bene esse.*] Have you examined the work entitled "A Practical Treatise on Railroads and Carriages, by Thomas Tredgold, C.E." published in London in 1825? If not, please examine the same, and state whether or not you find therein any description, drawing, or suggestion of such a railroad car as is described in the Letters Patent issued to the said Winans, Oct. 1st, 1834. If yea, please state where you so find such car. If not, state the differences existing.

37. [*De bene esse.*] Have you examined a work entitled "A Practical Treatise on Railroads and Interior Communications in General, illustrated by Engravings," by Nicholas Wood, colliery viewer, London, 1825? If not, please examine the same, and state if you find in said book any description, drawing, or suggestion of such a railroad car as is described in the said Letters Patent issued to the Complainant, Oct. 1st, 1834? If yea, state where in said book you find the same. If not, state the distinctive differences which exist therein.

38. [*De bene esse.*] Have you examined the specification annexed to Letters Patent issued to Ephraim Morris, Oct. 13, 1829, for "a new and useful improvement for raising and lowering boats from one level to another on canals"? If yea, please state whether or not the said specification describes such a railroad car as is described in the said Letters Patent issued to the said Winans, Oct. 1, 1834. If not, wherein do they differ?

39. [*De bene esse.*] Have you examined the specification annexed to Letters Patent issued to Jonas P. Fairlamb, 19th January, 1833, for "a new and useful improvement in constructing railroad cars"? If not, please examine the copy thereof hereto annexed describes such a car as is described in the said Letters Patent of the Complainant. If not, wherein do they differ?

40. [*De bene esse.*] Whether or not, in your opinion, does the temporary connection of two four-wheeled cars, by a temporary load of lumber, combine the advantages of the "eight-wheeled car"? If not, in what is it deficient, and wherein do they differ?

41. [*De bene esse.*] Whether or not, in your opinion, does a six-wheeled locomotive engine, having a four-wheeled truck under one end, constructed as the trucks under the eight-wheel cars, combine the advantages or exhibit the essential features of the invention of the Complainant? If not, wherein do they differ?

42. If you know any other thing relating to the invention of the said eight-wheeled car, please state it fully.

C. P. CURTIS, JR., *Solicitor for Complainant.*

UNITED STATES CIRCUIT COURT,
DISTRICT OF MASSACHUSETTS. — October Term, 1852. }

ROSS WINANS *vs.* EASTERN RAILROAD COMPANY,

IN EQUITY.

Cross-interrogatories to John Elgar, Benjamin H. Latrobe, Jas. R. Stabler, Caspar W. Wever, Caleb B. Moore, Geo. Mathews, John D. Steele, Sam. J. Wilder, Sam. Brooke.

X 1. If you answer the fourth interrogatory affirmatively, or state any specific facts in answer thereto, will you state whether you know those facts of your own knowledge? or have you derived them, or any of them, and if any, which, from information verbal, written, or printed, obtained from others? and if said information is derived from written or printed documents or statements, please annex the same, or a copy thereof, to your answer, giving the entire document to which you refer.

X 2. [*De bene esse.*] If, in answer to the first interrogatory, you state that the directors of said company became cognizant of the affairs of the company, or of the work done by its agents and officers upon the road and in the shops of the company, by means of reports made by different officers, agents, or servants of the company, will you annex to your answer all such reports, conveying said information to said directors relating to the construction or use of cars upon said railway, during 1829, 1830, 1831, 1832, 1833?

X 3. Were the reports, or any of them, mentioned by you in answer to the preceding questions, or any of them, published in the periodical called the American Railroad Journal, or any other printed publication published for the years 1829, 1830, 1831, 1832, 1833, or for either of those years? If yea, state the title of the publication; and, if any reports made to the president or directors of the company respecting cars are not contained in the publication you name for those years, please annex true and full copies of those reports, and state whether you were the author of any of those reports; and if so, by whom were those written by you signed.

X 4. Were there not, from 1829 to 1834, inclusive, distinct, or separate shops in which the different departments of car-building was carried on, viz. the blacksmithing, the painting, the woodwork for the bodies, and the truck-shop? If yea, state who were the persons who had the immediate and personal superintendence of each of these shops respectively; or, in other words, who was the boss of each of said shops.

X 5. How many hands or workmen were employed in each shop? Please name all you were personally acquainted with in 1830, 1831, 1832, 1833, and 1834; and state what shops each worked in, and whether, in your answer, you have stated the names of all that you knew at that time.

X 6. Were you acquainted with George Gillingham? When did you

first become acquainted with him? Was he Superintendent of the Baltimore and Ohio Railroad, and for what years? What were his duties on said road? Have you stated all his duties as Superintendent? What other duties, if any, had he? Is he dead?

X 7. Was not Jonathan Knight chief engineer of said road?

X 8. Are you acquainted with Ross Winans? Have you now, or have you had, means of knowing any thing in relation to his wealth? If so, will you state what he is worth, what he is reputed to be worth, or what he has stated he was worth?

[Objected to as irrelevant to the issue.]

X 9. In what year was the Baltimore and Ohio Railroad commenced? What American engineers are they with whom you were personally acquainted prior to that date? and whose experience do you undertake, if any, to swear to as to civil engineering? Can you undertake to say that you were at that time possessed of all the knowledge and experience of the best engineers of America?

X 10. If you answer the sixth interrogatory affirmatively, then please state, by name, what other railroads you refer to; and state whether your knowledge of other roads is derived from hearsay, or from personal inspection and measurement, or from books; and where was it derived, and from what particular book, if any; and state what were the exact differences in feet and inches, or other measurements, and in what particulars.

X 11. If you answer the seventh interrogatory affirmatively, then state on what roads you saw running gear in use at the time referred to; and, if any, what running gear was it that you saw? Describe it, and on what road.

X 12. In your answer to the ninth interrogatory, state what you consider as freight, naming the articles, and whether the first eight-wheeled car for carrying any particular kind of freight, such as cord-wood, or stone, or the like, had a specific name to designate it. If so, when was the name given? What was the name, and what did it carry, and when was it built, or put together, and used?

X 13. If you say, in answer to the ninth interrogatory, that a certain car was built under any person's direction, do you mean to be understood that such person, in the disposition of the different working departments of the company, was assigned or had a general supervision of the department in which the car was built? and state whether your answer is of your own knowledge, or derived from supposition.

X 14. If, in answer to said ninth interrogatory, you state that the car there inquired of was constructed by or under the direction of any person, will you state the names of the persons who built it, what were the specific directions to which you refer, whether written or verbal, or otherwise; who gave said directions, what was the substance of the language used, by whom was it spoken, to whom was it addressed, who was present at the time such instructions were given; and were such instructions given within your personal knowledge, presence, and hearing?

X 15. Was any cord-wood transported over the said Baltimore and

Ohio Road, or any part of it, previous to the construction of the first eight-wheeled car employed to carry passengers?

X 16. Are you not well aware that eight-wheeled cars, with two four-wheeled trucks, were used for transporting long sticks of timber, or string-pieces, on said road, during its construction, and before an eight-wheeled car for passengers was commenced? Give a complete description of the construction of said timber-cars.

X 17. Are you not aware that eight-wheeled cars, with two four-wheeled trucks, were made and used on said Baltimore and Ohio Road, for transporting cord-wood to Baltimore, or on any part of the road, before an eight-wheeled car for passengers was commenced?

X 18. When did you first see the Columbus, and where did you first see it on the said road?

X 18. Did you measure any of the proportions or dimensions of said car, or of any part thereof? and with what instrument did you make said measurements?

X 19. Have you made any of your answers to the tenth interrogatory, or the eleventh or twelfth, by mere conjecture or guess, without actual measurements?

X 20. Was the said car Columbus altered after it was originally built? If so, when?

X 21. By whom was it altered? Who did the work of said alterations?

X 22. [*De bene esse.*] If you have stated, in answer to the eleventh interrogatory, that said drawing does truly represent said car Columbus, will you state whether the *truck* represented under said car is a representation of said original truck of said original car Columbus? or was said truck originally constructed differently? And, if so, how?

X 23. How many feet in length and width was the body of said car Columbus? What was its height? What was the height of its railing? What was it drawn by? What was the length of the truck-frame? What was the height of the body above the side-pieces of the truck-frames? What was the diameter of the wheels across the tread? What was the diameter across the flanges? What was the distance between the treads of the wheels on the same side of each truck? What was the distance between the treads of the nearest wheels of the front and hind trucks?

What was the distance from the ends of the car-body to the tread of the wheels nearest to said ends respectively; and what was the space between the flanges and the sides of the rails?

X 24. What kind of boxes did the journals of the wheels of said car Columbus run in?

X 25. [*De bene esse.*] What do you understand to be represented by the ground-plan, being the lower of two drawings inquired of in the eleventh interrogatory, in that part of said plan where two concentric circles are drawn? Does it, or does it not, represent a transom-plate?

X 26. [*De bene esse.*] Are you not aware that the railing represented on said drawing, marked "Columbus," was not, in fact, upon said car Columbus, as she was originally constructed and put into operation on said railroad?

X 27. If you state, in answer to the twelfth interrogatory, that any other car or cars were made upon the plans and proportions of said car "Columbus," or differing therefrom, will you answer the inquiries put in the twenty-third and twenty-fourth cross-interrogatories, as though these questions had been put in relation to said other car or cars?

X 28. If you mention any cars, in answer to the fourteenth direct interrogatory, will you answer also, in relation to each of said cars, the same questions which are asked in relation to the car "Columbus" in cross-interrogatory number twenty-three?

X 29. If you mention any car or cars in answer to the fourteenth interrogatory, who designed them, or constructed them, will you state whether the original design of said cars was made in your presence? If so, who has it now? Will you produce it, or a true copy thereof, and annex it to your answer; and state whether said copy is a true and exact copy of said original? Was said original design used in the construction of said cars? If so, by whom, when and where, was it used? Have you made every word of your original answer to the fourteenth direct interrogatory from your own personal knowledge, or only from information derived from the statements of others; and will you state what part of your answer is derived from the one, and what from the other?

X 30. [*De bene esse.*] If you answer the fifteenth interrogatory in relation to the car "Dromedary," will you answer the same questions, in relation to said car, as are contained in the twenty-third cross-interrogatory, in relation to the car "Columbus"?

X 31. [*De bene esse.*] Will you answer the same questions, in relation to the car "Comet," as were put in the twenty-third cross-interrogatory in relation to the car "Columbus"?

X 32. If, in answer to the seventeenth interrogatory, you state that the experiments there indicated were necessary, will you state what are the proportions of the eight-wheel cars now in common and general use; and state what roads are said cars used upon; and will you give the names, number, or other marks, by which said cars are designated?

Will you now answer, as to the proportion and construction of the eight-wheel cars in common use, the following questions?—

1. What is the length of the body?
2. What is the diameter of the car-wheels?
3. What is the distance of the centres of the axes of said wheels apart, in each truck?
4. What is the distance of the trucks from each other, or from the ends of the car-body?

In short, what *principles* of construction or proportion did you consider that it was necessary to establish, or ascertain by experiment, after the "Columbus" was built; and what principles were, in your opinion, established by experiments made after the building of said "Columbus," which were not, in fact, embodied in said car "Columbus"?

X 33. What was the length of the body of the car "Columbus;"

what was the diameter of her car-wheels; what was the distance of the centres of the axes of said wheels apart; and what was the distance of the trucks from each other, and from the ends of the car-body?

X 33½. Was the car "Columbus" used for public travel on the Baltimore and Ohio Railroad? And, if so used, for what length of time? And state by whom, or by what officers of the company, was she run for the company.

X 34. If, in answer to the eighteenth interrogatory, you state that you know by whom cars, called "Washington cars," were designed or constructed, state if you saw the design made, and annex the original, or a true copy thereof, compared by yourself, from which the cars were built, at what time the cars were commenced, who did the work, who built the trucks, and state whether they differed from other cars in the construction of the trucks, in what particulars, and from which of the other cars did they differ.

X 35. When and where did you last see said car "Columbus"? When did you last see her in use; and when did she first go into use?

X 36. Are you aware of the fact, that a number of freight or house-cars were constructed under contract, or otherwise, by Mr. Jacob Rupp, or some one else, prior to the completion of the Washington cars?

X 37. If yea, how were said freight-cars drawn? In what respect, if any, did these freight-cars differ from the Washington cars, as to the trucks and arrangement of trucks?

X 38. In what respect did said freight-cars differ from the "Columbus" as to the trucks?

X 39. What was the gauge of the track of the Baltimore and Ohio Railroad in 1830?

X 40. If you have made any statement as to the authority that Conduce Gatch had or had not, in relation to making cars, will you state how you know that he had or had not the authority you have attributed to or denied him? What personal knowledge have you on the subject? Do you know what authority he had from George Gillingham, and what was said Gillingham's capacity on said road? Do you know what authority said Gatch had from any other person except yourself?

X 41. Are you not aware that, in point of fact, said Conduce Gatch did buy materials, hire men and superintend them, and give directions as to the building of cars, from time to time, on the said railroad? What orders, if any, did you ever hear given in your presence, to said Conduce Gatch by any person? State what said orders were, and who gave them, and when they were so given, and who were present at the time or times.

X 42. Whether or not did the car "Columbus" begin to run in July, 1831; and was it followed at intervals by other cars, called the "Dromedary," "Winchester," and "Comet"? Were either of these in use for the public travel from the time they were respectively completed; and did said Ross Winans know that such was the case; and

were said cars, or either of them, thus used with his knowledge and consent?

X 43. Are you now, or have you ever been, or have you any expectation of being, in the employ or service of Ross Winans, or of any party interested in the said Winans' patent of October 1, 1834; and have you any interest whatever, direct or indirect, in said patent, or in its success, or concerning it in any way?

X 44. Who are the parties interested in said patent, so far as you know?

X 45. Was not the said car "Comet," the last eight-wheel car for passengers that was made and run, preceding the date of said Winans' patent, October 1, 1834?

X 46. Were not the Washington cars built in the summer of 1835?

X 46½. Was not the car "Comet" a failure in actual practice? How long did she run in her original shape, and what became of her? Where is she now?

X 47. Did the flanches of the car-wheels run outside or inside of the rails, when the first passenger-cars on said Baltimore and Ohio Road first began to run; and when was the alteration made so as to have them run inside of the rails?

X 48. Have you seen any of the interrogatories put to you, on behalf of the Plaintiff, before this examination? If so, when, where, and by whom, were they exhibited or stated to you?

WILLIAM WHITING, *Solicitor for Defendants.*

A true Copy. Attest,

H. W. FULLER, *Clerk.*

Deposition of Jonathan Knight, of East Bethlehem township, in the County of Washington, and Commonwealth of Pennsylvania, a witness I have caused to be brought before me, John Freeman, the Commissioner named in the commission hereto annexed, at Washington, in the County and State aforesaid, on the twenty-first day of July, in the year of our Lord one thousand eight hundred and fifty-three, by virtue of the power in me confided by the annexed commission issued from the Circuit Court of the United States, within and for the Massachusetts District, for the examination of the said Jonathan Knight, in a certain cause now pending in said Court, wherein Ross Winans is Plaintiff in Equity, *vs.* The Eastern Railroad Company, Defendants.

Jonathan Knight, having been first duly affirmed as hereinafter certified, doth depose and say as follows, to wit:—

In answer to the first interrogatory. My name is Jonathan Knight; aged sixty-five years; residence, East Bethlehem, Washington County, Pennsylvania; occupation, agriculture,—this business has been continuously conducted by me, in the said vicinity, for more than thirty-

five years, notwithstanding my attention, through a large portion of that time, to civil engineering.

In answer to the second interrogatory. I was in the employ of the Baltimore and Ohio Railroad Company, as chief engineer, from the first of January, A. D. 1830, to the first of April, A. D. 1842, when I resigned to retire from the profession. Since the latter date, I consented to act for said company on one or two brief occasions, for the solution of definite questions relating to their road. I was likewise in their service in the years 1828 and 1829, as one of a Board of engineers, which Board was discontinued by the company near the end of the latter year. In 1828, I visited the short railroads of Mauch Chunk and of Quincy, the only improvements of that kind then in America; and, the same year, visited England for railroad information for the company, returning to Baltimore in 1829.

In answer to the third interrogatory. I know the Plaintiff, Ross Winans. In 1830 he returned from England, where he had been concerning his friction-wheel car, and entered upon perfecting the practical application of that car on the Baltimore and Ohio Railroad. By authority of the said company, to avail of his high mechanical and inventive talents, I appointed him, in or about the beginning of the year 1831, my assistant engineer of machinery; in which service he continued until 1835.

In answer to the fourth interrogatory. Under the Board of President and Directors, the business of the company was conducted by a superintendent of construction for building the road; a superintendent of machinery, who managed the shops, and constructed and repaired the engines and cars; a superintendent of transportation, who conducted the movements of the trains upon the finished road, for the transit of passengers and freight; a treasurer, and a secretary. All of these reported annually, and oftener if required, to the President of the company, and were required to communicate frequently with committees of the Board. The chief engineer had a general supervision over all the departments; made the location of the road, and the estimates for its construction and equipment; and performed other services when required. He reported annually, and oftener, to the President.

In answer to the fifth interrogatory. In the year 1828, when the Baltimore and Ohio Railroad was commenced, American engineers had no experience in railroads for the general purposes of the transit of persons and things. The only railroads then built in this country were the Mauch Chunk, of nine miles long, for carrying coals by gravity and mule-power; and the Quincy, of some three miles long, for carrying granite by animal-power. Nor was there then any railway for the general purposes of transit in operation in any part of the world. The Liverpool and Manchester Road, for the conveyance of passengers and goods, was projected and then under construction, but was not opened for use until September, 1830. All other railways in England, operating in 1828, were for carrying coals, the products of quarries, furnaces, &c., but not for carrying passengers.

In answer to the sixth interrogatory. The Baltimore and Ohio

Road was originated, or stimulated into existence, in consequence of the projected Liverpool and Manchester Road, and for a similar junction, the conveyance of passengers as well as freight; and hence the two short roads, already mentioned, could afford no model for the projected improvement, either regarding the track or the equipment.

In answer to the seventh interrogatory. The machinery and running gear on the colliery-roads, the only railways in general use in 1828, not being adapted to the carrying of passengers and of general freight, therefore entirely new and different machinery had to be originated and built. To describe the modifications or changes that had to be made would involve a description of the English coal-car, on the one hand; and, on the other, the locomotives, tenders, passenger and freight-cars, stations, shops, engine and car-houses, water stations, &c. &c., of the railroad as now in use; which description is supposed unnecessary.

In answer to the eighth interrogatory. The road-equipments, inclusive of motive machinery, having thus to be originated, the purpose could be accomplished only by invention, theory, and experiment; and no invention or new machinery could be adopted but such as a due course of experiments should prove to be economical and well adapted to the end proposed. The Baltimore and Ohio, as a pioneer road, had, consequently and unavoidably, to make the greater amount of inventions and experiments, and that through a series of years. Those experiments had regard to axles, journals, boxes, friction-wheels, car-wheels, cars for passengers and for freight, locomotives, tenders, the effects of curves in the road, &c. &c.; and were conducted by the assistant under the direction of the President of the company and the chief engineer. Of the persons so engaged the Plaintiff was most conspicuous. Invention and experiment were the primary and chief objects of his employment. The company to have the free use on their roads, of all such his inventions, to compensate for the expense incurred and his salary; he reserving his legal rights under the patent laws as regarded other companies. The invention by him of the "eight-wheel car" was a brilliant result of his genius, and of those experiments made by him on that road.

In the answer to the ninth interrogatory. The first eight-wheel car on the Baltimore and Ohio road, to the best of my recollection, was called "The Columbus." It was placed on the road in 1831, as a passenger-car, and was built in the company's shops, under the direction of the engineer-department of the company, and particularly of Ross Winans, my assistant, who designed it.

In answer to the tenth interrogatory. The said car was a novelty; all previous cars in use on railways for transportation having only four wheels, so far as known or recollected by me.

In answer to the eleventh interrogatory. I have examined the drawing, as requested, and believe it to represent the said car Columbus.

In answer to the twelfth interrogatory. The Columbus, the first experimental car of eight wheels, consisted of a body about twice the length of a four-wheel car, placed on two four-wheel trucks, furnished

with Winan's friction-wheels, similar to those of that description in the four-wheel car. The Columbus was without springs, the passenger-baggage was to be carried on the top, and the motive power operated by means of a perch attached to the running gear. The body was attached to each truck by a bolster and centre-bolt, about which the truck turned or swivelled. The object of the inventor, Winans, was to get up a more safe, capacious, comfortable, and steady car, and one that would traverse the quick curves of the road with more facility and with less wear and tear than the car of four wheels. These objects were, however, in this instance but partially effected, the car proving defective in several particulars. Comparing this car with that finally perfected, we may say that the friction-wheels were to give place to the box and springs; the axles of the trucks were to be brought nearer to each other, while the trucks were placed further apart; the motive-power and connections were attached to the car-body, and not to the truck. These modifications were successively effected and proved upon the road in the eight-wheel cars Winchester, Comet, and Dromedary, to an extent sufficient to indicate all the arrangements and proportions necessary to perfect the machine, and to adapt it to the purpose intended. In this state of perfection, the eight-wheel car for passengers was by me recommended to the company, and adopted in 1834; and ten such cars were ordered for the Washington branch, to be opened the ensuing summer.

I beg leave here to correct an error in my answer to the sixth interrogatory in the case of *Ross Winans vs. the Troy and Schenectady Railroad Company*. I stated in that answer, relating to the car Columbus, that "the wheels on the side of each truck were as close to each other as their flanges would well permit of;" thus inadvertently confounding it, in this particular, with the more perfect arrangement in subsequent improved cars.

In answer to the thirteenth interrogatory. The Washington Branch Railroad was opened for use on the twenty-fifth August, 1835.

In answer to the fourteenth interrogatory. It became evident, before the end of the year 1833, that the eight-wheel car designed by Ross Winans, the Plaintiff, would admit of a perfection that would justify its use for passenger-travel. This was fully verified in 1833, 1834, in which last year it was adopted by the company.

In answer to the fifteenth and sixteenth interrogatories. I suppose the two drawings alluded to, represent the two cars Comet and Dromedary, herein before mentioned. They were eight-wheel cars,—experimental, and in a state of transition between the Columbus and the final perfection of the invention, which took place in 1834.

In answer to the seventeenth interrogatory. Many experiments through the years 1832, 1833, to 1834, were made assiduously and continuously by the Plaintiff, on the Baltimore and Ohio Railroad, before the eight-wheel car was perfected.

In answer to the eighteenth interrogatory. I suppose the Washington cars were those in use, or intended to be used, upon the Washington Branch Road. They were ordered in 1834, and built before the opening of that road in 1835. They were designed by the Patentee, Ross Winans.

In answer to the nineteenth interrogatory. The Washington cars did not, so far as I know, materially differ in principle or arrangement, or in any thing essential, from the eight-wheel cars now in use. How they differed from the Columbus is closely indicated in my answer to the twelfth interrogatory. How they differed from other experimental cars, I cannot now say with certainty or minuteness.

In answer to the twentieth interrogatory. The eight-wheel car for freight was adopted on the Baltimore and Ohio Railroad about the time, or very soon after, the adoption of the eight-wheel passenger car. For in October 1835, there were upon that road forty-eight of the former, and twenty-five of the latter; while a greater number of such cars, especially for freight, were under construction.

In answer to the twenty-first interrogatory. In answer to this interrogatory, I have to say, that, so far as my knowledge extended, Ross Winans, the Plaintiff, was spoken of, and commonly known, by those conversant with him and his employments, as the inventor of the eight-wheel car then and since used on railroads for the conveyance of passengers and of freight. From the intimate knowledge I had of him, his course of thought, conversation, drawings, experiments, and doings in this connection, within and during the period from 1830 to 1835, I fully believe him to be such inventor. I mean that the combination and arrangement of the principles and parts of the eight-wheel car, so as to produce the beneficial effects it does, are his invention.

In answer to the twenty-second interrogatory. In the car of four wheels, to insure stability and to prevent tilting end-wise, the two axles have to be placed from three and one-half to six feet apart. In fact, the distance is seldom less than four and one-half feet; and, for the greater degree of steadiness in this car, some adopt the rule of a square frame, in which case, on the Baltimore and Ohio Road, the distance would be four feet eight and one-half inches. With this distance of the axles asunder, therefore, to give stability, the friction of the flanges at the rails, and consequent wear and tear and loss of effective power, becomes very considerable. The four-wheel passenger-car, from its contracted space not permitting of a retiring room, nor of a stove in winter, both being essential to comfort and health, its unsuitableness to passenger-travel is sufficiently evident; and hence the eight-wheel car, remedying these defects, is quite essential to develop and secure the full advantages of the railroad, and in importance is second only to the locomotive engine. For a curved road in the truck supporting each end of the eight-wheel car, the two axles are placed as near to each other as is compatible with a free revolution of the two wheels on each side, without contact with each other. The truck of four wheels will then be so compact as to traverse the curves of the road nearly with the like ease and freedom from resistance and wear as would two wheels upon a single axle. Two such trucks, as in the eight-wheel car, being placed under the car-body in a manner to turn at a centre freely, will, therefore, traverse a road approximately as easy as only one of them; while the car itself may be of a desirable length, say to accommodate forty, fifty, sixty, or even more passengers.

In answer to the twenty-third interrogatory. I am not certain, but think I knew Winans' intention to obtain Letters Patent for the eight-wheel car but a short time, possibly a month or more, anterior to their date.

In answer to the twenty-fourth interrogatory. I have examined the Letters Patent, and specification annexed, issued to Ross Winans, 1st October, 1834, for an improvement in the construction of cars or carriages for railroads; and, in my opinion, the same are sufficient to enable a skilful mechanic to construct such a car, suited to the safe transit of passengers or of freight, at a speed of twenty or more miles per hour.

In answer to the twenty-fifth interrogatory. In my opinion, a car constructed according to the drawing mentioned, marked A, would exhibit the advantages claimed in the text of the specification aforesaid. My experience and knowledge had on the Baltimore and Ohio Railroad leave me no doubt in this matter.

In answer to the twenty-sixth interrogatory. I believe the eight-wheel cars in general use on railroads conform, in all essential particulars, to the description in said Letters Patent.

In answer to the twenty-seventh interrogatory. I regard the novelty secured to the Plaintiff in said Letters Patent to be the combination and arrangement of the principles and parts of the eight-wheel car, so as to produce the beneficial effects it does, and which were claimed for it; or the arranging and connecting of the eight wheels, which constitute the two bearing carriages with the railroad car, so as to accomplish a more safe, capacious, comfortable, steady, and economical transit upon railroads than had before been obtained, as experience has undoubtedly evinced.

In answer to the twenty-eighth, twenty-ninth, and thirtieth interrogatories. The length of body and distance between the axles of four-wheel cars were regulated by motives of convenience and stability, as mentioned in my reply to the twenty-second interrogatory. The actual length of the body I do not recollect; but it may have been twelve or fourteen feet, or even more in some cases. The diameter of the wheels was thirty inches, and the distance apart of the axles perhaps about four and one-half feet. The dimensions were determined in the engineer department by the chief engineer, or approved and sanctioned by him.

In answer to the thirty-first interrogatory. The minimum radius of curvature adopted for the Baltimore and Ohio Railroad was four-hundred feet, and curves of that radius were frequent. The rail at first adopted and laid down so far as to Harper's Ferry Narrows, eighty miles, was denominated "the plate rail." It was a flat bar similar to wagon tire, two and one-fourth inches wide, five-eighths thick, in bars fifteen feet long, weighing about fifteen pounds per lineal yard. In 1838, it was determined to use the edged rail, of about fifty-two pounds per yard, in the extension of the road west of Harper's Ferry; and in the renovation of the track east of that point, nineteen miles were laid with that rail in 1839. The Washington Branch had been opened in 1835 upon an edged rail of forty pounds per yard.

In answer to the thirty-second interrogatory. I do not recollect the weight of rail then on the Mauch Chunk and Quincy Roads, but believe it was somewhat less than that adopted for the Baltimore and Ohio Railroad. In England, the best railway then in operation, the "Stockton and Darlington," had an edged rail of twenty-eight pounds to the yard; and the design was to lay upon the Liverpool and Manchester Road a rail of thirty-five pounds. With this weight of rail that important road was opened in the autumn of 1830; which rail, proving deficient in strength, it was, if I rightly remember, soon succeeded by one of fifty pounds, which latter subsequently gave way for a rail of seventy-five pounds to the yard. The practice then was to lay the rail in cast-iron chairs based upon stone blocks placed three feet apart, after which method a seventy-five pound rail, in my opinion, would not be more effective than one of fifty-two pounds upon wood cross-ties, as practised in the United States.

In answer to the thirty-third and thirty-fourth interrogatories. I have no recollection of the person named Conduce Gatch. Nevertheless, he might have operated in some of the work-shops. But I am not aware, nor do I believe, that he had any authority to construct, or order to be constructed, cars of other kinds or proportions than such as had been designed and ordered by the engineers of the company.

In answer to the thirty-fifth interrogatory. I do not recollect to have seen the specification and drawing of Letters Patent issued to William and Edward Chapman, as mentioned in the thirty-fifth interrogatory; nor do I know that they are within my reach for the present occasion.

In answer to the thirty-sixth interrogatory. I have a copy of the work entitled "A Practical Treatise on Railroads and Carriages, by Thomas Tredgold, civil engineer," reprinted in New York, 1825. I cannot now put my hand upon the London copy; but, from my knowledge of it, I have no doubt of the faithfulness of the New York copy. In this work, page 94, in twenty-two lines, is the description of an eight-wheeled carriage to be composed of a body resting upon two frames of four wheels each; a drawing of which is shown in fig. 26, plate iv., with description on page 179, being the final plate in the book. The primary and sole object of this proposed carriage, which probably was never put in practice, was to lessen the expense of the rails, by reducing the load upon each wheel by placing upon eight wheels the load that had been upon four; and the arrangement was intended to be such as to cause the weight upon each of the eight wheels to remain the same whatever might be the change of *level* in the rails. No further condition, or effect, seems to have been aimed at. The foregoing are the only parts of the book, I believe, that allude to a carriage of eight wheels; and I have no hesitation in concluding that what is given in the book, as above mentioned, contains no description, drawing, or suggestion of such a railroad-car, or for such a purpose, as is described in the said Letters Patent to Ross Winans, of the first October, 1834.

In answer to the thirty-seventh interrogatory. I have examined, and have long been familiar with "A Practical Treatise on Railroads and Interior Communications in general, illustrated by engravings," by

Nicholas Wood, colliery viewer, London, 1825; but I find in said book no description, drawing, or suggestion of such a railroad-car, or for such a purpose, as is described in the said Letters Patent issued to Ross Winans, on the first October, 1834. In the said work, pages 144, 145, the author says, regarding a locomotive of that day: "The weight of the engine forming one great obstacle to its introduction where the rails are weak, it was of the utmost importance to find out some remedy. Mr. Chapman, in his patent for the application of a chain, described a plan of placing the weight of the engine upon two frames, supported by six or eight wheels; and the Wylam engines, being heavier than the rails would bear, were placed upon eight wheels; but the complication attendant upon so many wheels, and the unwieldy nature of such a length of framing, formed, altogether, so many objections as to render them almost useless as a species of moving power. The application of the steam bearing cylinders divided the weight equally upon the four wheels, and, if necessary, upon six wheels, as shown in fig. iv., plate iv.; and thus caused one frame to be sufficient; and, consequently, simplified their construction proportionably." The rail upon which the Wylam engines ran was a plate-rail; and, on page 156, the author remarks that "the railroad on which these engines travel being too weak to support the weight divided on four wheels, recourse was obliged to be made to eight wheels." At the middle of the support of each frame was a bolt, which allowed a lateral motion in the frames to conform with the occurrence of curvatures in the line of the road; page 155, where a reference is made to a side view on plate vi.

As in the case mentioned in Tredgold, already noticed, so here the primary and sole object in the eight-wheel arrangement was the division of the weight on more wheels than four, to enable the comparatively weak railway of that day to sustain the action upon it. And the two frames, and the admitted lateral movement in them to pass the curves, were incidents merely, compelled from necessity, in order to accomplish the primary and only intention, namely, a division of the weight of a heavy engine over a greater length of rail. But this arrangement for the locomotive engine proved entirely abortive, as stated that it did by the author now quoted, and which failure was so complete that no mention of this form of engine is made in the subsequent edition of Wood's treatise on railroads, of London, 1831. Nor did the English take any hints from the aforementioned works of Tredgold and Wood, of 1825, to originate any car at all similar in form, purpose, or effect, as that of Winans.

In answer to the thirty-eighth interrogatory. I have examined the specification of Ephraim Morris for "a new and useful improvement for raising and lowering boats from one level to another in canals," and do not understand it as describing a car having the principles or functions of that described in the Letters Patent of Winans, of first October, 1834. Morris's system of wheels and axles were arranged to overcome vertical, but not horizontal, angles or curves.

In answer to the thirty-ninth interrogatory. I do not recollect to have seen the patent or specification of Jonas P. Fairlamb, of 19th January,

1833, for "a new and useful improvement in constructing railroad-cars."

In answer to the fortieth interrogatory. In my opinion, the connection of two four-wheel cars by a temporary load of lumber does not combine the advantages of the eight-wheel car as invented and patented by Winans. It would not constitute an organized machine, effective for the purposes to be attained by Plaintiff's or Complainant's car. It would be essentially defective in ease, safety, and economy, in traversing the curves of the road at velocities of twenty miles or more per hour; for the draft would be from the truck, and its wheels too far apart.

In answer to the forty-first interrogatory. In my opinion, a six-wheeled locomotive engine, having a four-wheeled truck under one end, constructed as the trucks under the eight-wheel cars, would not combine the advantages or exhibit the essential features of the invention of the Complainant. The desideratum obtained from combining the advantages of the near coupling of the axles of the truck of four wheels with the more distant position under the car-body of two such trucks in the eight-wheel car, does not fully obtain in the case of the locomotive. The latter is not more perfect as a machine to turn the curves in the road, than the said car would be after substituting for the hindmost truck a single axle and two wheels. And it is quite obvious that this would destroy the symmetry and equable action, and otherwise mar the perfection, of the eight-wheel car in several respects.

In answer to the forty-second interrogatory. I do not now recollect any thing further, that appears essential, relating to the invention of the eight-wheel car.

In answer to the first cross-interrogatory. I have answered the fourth interrogatory from my own personal knowledge and recollection.

In answer to the second cross-interrogatory. I cannot now command the reports alluded to, so as to furnish copies of them.

In answer to the third cross-interrogatory. It is believed that the annual reports for 1831, 1832, and 1833, of the President and of the chief engineer of the Baltimore and Ohio Railroad, were published in the American Railroad Journal for those years; and that these and previous reports were probably published in the newspapers Baltimore American and Baltimore Patriot at the then time current, and I am not now aware that there were any reports upon cars other than those and their accompanying papers, but cannot now furnish copies. In regard to the authorship of my reports, since the doubt has been raised in the interrogatory for the first time to my knowledge, I have to say that I originated, matured, and penned every railroad report at any time made or signed by me as chief engineer.

In answer to the fourth cross-interrogatory. There were, in the period mentioned, distinct shops or working apartments, for the different parts of car-construction; but I cannot now name the persons who acted as foremen or bosses.

In answer to the fifth cross-interrogatory. I do not know how

many hands or workmen were employed in each shop, nor do I recollect any of their names with certainty.

In answer to the sixth cross-interrogatory. I was acquainted with George Gillingham, I think, from the year 1831. He was not superintendent of the Baltimore and Ohio Railroad, but was superintendent of machinery from 1832 to 1835, inclusive. I believe he is dead.

In answer to the seventh cross-interrogatory. I *was* chief engineer of the Baltimore and Ohio Railroad.

In answer to the eighth cross-interrogatory. I am acquainted with Ross Winans, but have seldom seen him since I left that road in 1842. I do not know his worth, or reputed worth, in point of wealth; nor has he ever made me any statement of his wealth.

In answer to the ninth cross-interrogatory. The construction of the Baltimore and Ohio Railroad was commenced in 1828. Prior to that date, I was acquainted with Col. J. G. Totten, Col. J. J. Abert, Gen. McComb, Capt. W. G. McNeill, Lieut. J. Trimble, Col. Wm. Howard, James Shriver, and perhaps others, American engineers. But I do not undertake to swear to any one's experience; nor can I say that I was then, or since, possessed of all the knowledge and experience of the best engineers of America. I take no such position, nor make any such pretension.

In answer to the tenth cross-interrogatory. My knowledge of the Mauch Chunk and Quincy Railroads in America was from personal inspection. The track of the former was three and one half feet wide, laid with a plate-rail two inches wide by about one half an inch thick, and its descent averaged about one hundred feet per mile, through its length of nine miles, from the coal mine to the head of the Schute at the Lehigh navigation. Curves of two hundred feet radius were admitted. The Quincy Road was likewise laid with a plate-rail, somewhat broader but of about the same thickness. The width of the track I do not recollect; it might have been some five feet; but it had a more moderate descent from the quarry to tide-water, some three to three and one-half miles.

In answer to the eleventh cross-interrogatory. The coal car then in use at Mauch Chunk was of the form of those I witnessed in use in England on the collier railroads of from three and one-half to four and one-half feet in width of track, leading from the pits to the *staiths* upon the Tyne, Weir, or other rivers admitting access to shipping. The body of the car was of wood, — rectangle, horizontally, — hopper shaped, vertically; and placed upon a square frame, supported upon the four wheels that ran upon the rails. The car, or moving vehicle, upon the Quincy Road, was a stout frame of wood upon four comparatively high road-wheels; to which frame the granite blocks or slabs, to be transported at a slow speed by animals, were suspended, beneath the two axles.

In answer to the twelfth cross-interrogatory. I understood the ninth interrogatory to inquire after the *first* eight-wheel car placed upon the Baltimore and Ohio Railroad. Now, that car having been for passengers, my answer was given accordingly. The first car, then, not being for *freight*, it did not seem necessary to define my understanding of that

term. However, I can say that I believe the first eight-wheel car for freight was put upon that road in 1834; certainly there were several such in 1835. The name of the first such freight-car, if it had a name, I do not recollect. Sometimes the word "freight" is employed to mean the price of carriage; but I here use it as meaning the load or articles carried, whether of merchandise, coals, flour, or other material thing, in contradistinction to passengers.

In answer to the thirteenth cross-interrogatory. In allusion to my answer to the said ninth interrogatory, I have to say, of my own knowledge, that Ross Winans was by me, and as my assistant, assigned a general and particular supervision of the construction of the cars.

In answer to the fourteenth cross-interrogatory. My said assistant was charged by me with giving to those in charge of the construction every necessary attention and instruction relating to the said car; but I cannot now call to mind the names of those persons; nor what were the specific directions; nor the substance of the language used; but the latter were doubtless then known to me.

In answer to the fifteenth cross-interrogatory. It is probable; but I cannot now aver that cord-wood was transported upon a portion of said road previous to the construction of the eight-wheel car for passengers.

In answer to cross-interrogatories sixteenth and seventeenth. I am aware that, anterior to the first eight-wheel car for passengers, long timbers for longitudinal supports of the rails or embankments, of portions of the Baltimore and Ohio Road, were transported over parts of that road upon two of the then ordinary four-wheel trucks, each of which having a bolster with a center-pin, to enable it to swivel, as in the case of a common wagon, the latter to traverse the curves of the road. The timbers to be transported, rested upon the two bolsters, and were thus conveyed by animal power at a low speed. The vehicle so arranged was quite temporary; so much so as not to acquire the denomination of a "car." I do not recollect that cord-wood was thus carried upon two of the then four-wheel trucks. Such a vehicle, however, was not an organized eight-wheel car, capable of the use or functions of such a car as described in the specification and drawing of the Letters Patent of Ross Winans; and would not have kept the track with any certainty, safety, or economy of wear and tear, at velocities exceeding four miles an hour. It had too much rigidity, the wheels of the truck were too far asunder for that road, and the whole was wanting in the proportions and symmetry of the eight-wheel car; while, in violation of one of the principles of action of the latter, the draft was, and had to be in that timber-vehicle, attached to the running gear or truck-frame, thus very materially restraining its freedom in traversing the curves of the road.

In answer to cross-interrogatories eighteen and eighteen and one-half. I first saw the Columbus in 1831 in the shop, and then on the road. I do not recollect myself of measuring the dimensions, but doubtless I knew them.

In answer to the nineteenth cross-interrogatory. I have not an-

swered the tenth, eleventh, and twelfth interrogatories, by mere conjecture and guessing, but from knowledge and my best recollection.

In answer to cross-interrogatories twenty and twenty-first. My recollection is not sufficient to enable me to say that the Columbus was altered. But other cars were soon built varying from it.

In answer to the twenty-second cross-interrogatory. I have no reason to conclude otherwise than that the *truck* represented in the drawing, as under the Columbus, is a correct representation of the original truck.

In answer to the twenty-third cross-interrogatory. I know that the diameter of the wheels, at the tread, was thirty inches, and through the flange thirty-three inches, the flange being one and one half inches. The space for the play of the flanges between the rails was one and three-fourth inches; and, when equidistant, the space between each flange and the nearest rail was seven-eighths of an inch. These being the only measures that I recollect with confidence, the remainder of my answer must consist of inferences derived from measuring the drawing by scale, admitting the parts to be proportional to the wheels whose diameter is known, as follows (scale one and three-eighth feet to the inch): Length of car-body twenty-four feet four inches; width of car-body, seven feet six inches; height of car-body, six feet six inches; height of railing, one foot six inches; length of truck-frame, nine feet one and a half inches; height of body above truck-frame, one foot three inches; distance of tread of wheels on same side of truck, four feet one and a half inches; distance of treads of nearest wheels of the two trucks, nine feet one inch; distance from end of body to the tread of the nearest wheel respectively, three feet six inches. The car Columbus was drawn by a *perch* attached to the truck-frame.

In answer to the twenty-fourth cross-interrogatory. The journals of the car Columbus plied in the interior periphery of Winans' friction-wheel.

In answer to the twenty-fifth cross-interrogatory. I cannot now say, certainly, what was intended to be represented in the part mentioned; but suppose it relates to a circular plate and arrangement for the turning or swivel motion of the truck-frame, beneath the bolster.

In answer to the twenty-sixth cross-interrogatory. I am not aware that the railing represented in the drawing was omitted in the car Columbus, nor do I think that such was the fact,—for the mode of carrying baggage then was upon the deck, or top of the car. On adopting Winans' eight-wheel cars, however, one of the eight-wheel cars of the train was designated as a baggage-car.

In answer to the twenty-seventh and twenty-eighth cross-interrogatories. I cannot now give the particular dimensions of the parts of the several transition-cars that intervened between the Columbus of 1831 and the perfect car of 1834. At the same time, my recollection is, that Winans' friction wheel gave place to the plain box for the journals on all the eight-wheel cars after the Columbus; but that the baggage continued to be carried upon the top of the passenger-car for a year

or two after 1831; also, that the truck was modified, so as to place the wheels nearer together.

In answer to the twenty-ninth cross-interrogatory. I have answered the fourteenth interrogatory from my own personal knowledge, and not from information derived from the statements of others. The eight-wheel cars, from the Columbus to the more perfect and adopted ones, were designed and planned by Ross Winans; but I do not recollect that the drawings were made in my presence; I think they were not. I did not retain in my possession any of his drawings, but they were used in the construction of the cars.

In answer to cross-interrogatories thirty and thirty-first. The wheels under the cars Comet and Dromedary were similar to those under the Columbus, but the trucks were changed so as to bring the axles nearer together; the exact distance, however, or dimensions of these cars, generally, I have now no means of giving.

In answer to the thirty-second cross-interrogatory. The Columbus was a passenger-car placed on eight wheels, composed of two ordinary trucks of four wheels each, and having a body of considerably greater length than would be stable on four wheels only. Thus a great step was made in the right direction, namely, towards the perfect eight-wheel car afterwards brought forth on the Baltimore and Ohio Railroad, and patented by Ross Winans on the first October, 1834. But the principles of the perfect car were not all combined in the Columbus. The very essential proportions of the distance apart of the two trucks, and of the wheels in the same truck, so as to ensure stability, safety, and economy of transit, in a curved road, were not in the Columbus. Besides, in the Columbus, the power of traction was had or communicated by the medium of a *perch* attached to the truck, and not directly to or with the frame of the car-body; and in this way, also, the Columbus was unstable on the track, and could not traverse the curves as a car ought to do. Modifications in these particulars, and in others of less vitality, but of very great practical importance, and essential to the perfection of the machine, were made from 1831 to 1834; and thus the eight-wheel car was perfected upon the Baltimore and Ohio Railroad of the principles described and claimed in Winans' said patent, — which sort of car was adopted for the said road and its Washington branch, upon which roads it is used to the present day, as well as upon all the railroads for the transit of passengers in the United States, so far as I know and believe.

According to the patent, the car-body may be of any length, width, or height that use and convenience may dictate; and hence it will be readily granted that it is not now in my power to give the previous dimensions of all the cars so extensively employed; or their names, number, or other marks by which they are designated.

In answer to the thirty-third cross-interrogatory. In answer to this, I refer to my answer to the twenty-third cross-interrogatory.

In answer to cross-interrogatory thirty-three and one-half. The car Columbus was used in carrying persons on the short part of the road opened to Ellicott's mills, thirteen miles; the passengers were few, the company were experimenting, and I think this car was soon (in the

year 1833) superseded, or it may have been modified. The running of the cars was under the direction of William Woodville, superintendent of transportation.

In answer to the thirty-fourth cross-interrogatory. The designs or drafts of the "Washington cars" were doubtless familiar to me at the time, but were not made by me, nor perhaps in my immediate presence. I have now no such drafts, and cannot furnish copies of such. These cars were ordered in 1834, and their construction was commenced in that year in the company's shops at Mount Clare. I do not recollect the names of the workmen so engaged, nor do I recollect the measured or definite differences in these cars, in these trucks or otherwise, from the other cars then on the Baltimore and Ohio Road. But I do remember that these "Washington cars" were to be equal, at least, to the best that had been got up, and were to contain all the principles of the eight-wheel car to be patented by Winans.

In answer to the thirty-fifth cross-interrogatory. The car Columbus was first used on the Baltimore and Ohio Railroad between Mount Clare and Ellicott's Mills. I think it was there, in 1831 or 1832, that I last saw her; but upon this point my memory is not clear.

In answer to cross-interrogatories thirty-six, thirty-seven, and thirty-eight. Freight or house cars may have been, and probably were, constructed, under contract or otherwise, by Jacob Rupp, or some one else, prior to the completion of the Washington cars; but I cannot now call to mind the facts, so as to say positively; nor can I now say, if such cars were so built, how they varied in their trucks or otherwise from said Washington cars. It is probable, however, that such freight-cars so constructed for, or constructed at, that time, had only four wheels. But, if of eight wheels, the truck was probably similar in arrangement to that for the Washington cars.

In answer to the thirty-ninth cross-interrogatory. The gauge of the track of the Baltimore and Ohio Railroad in 1830 was four feet nine and a fourth inches.

In answer to cross-interrogatories forty and forty-first. George Gillingham was superintendent of machinery; but as to a person named Conduce Gatch, I do not recollect him. Nevertheless, a person of that name may have been employed as a foreman in a shop for construction. Not, however, being able to recollect him, I cannot answer otherwise than I have done in reply to the thirty-third and thirty-fourth direct interrogatories.

In answer to the forty-second cross-interrogatory. The car Columbus began to run in June or July, 1831, to the best of my recollection. She was followed by other cars subsequently built; namely, the Winchester, Comet, Dromedary, and others, in the carriage of persons, and as experimental cars, to enable the company, through its departments and assistants, to improve the cars to the greatest extent practicable. At that time, this road was the sole one in America upon which such experiments were being, or needed to be, conducted; and it was absolutely incumbent to push the experiments to practical and successful results, without unnecessary delay. In these experiments, modifications, trials, and tests, I had the assistance of Ross Winans, who,

in fact, was the inventor and designer, and of course was privy to them.

In answer to the forty-third cross-interrogatory. I am not now, have never been, nor do I expect to be, in the employ or service of Ross Winans, or of any party interested in the said Winans' patent of October 1, 1834; nor am I aware that I have any interest whatever, direct or indirect, in said patent or its success, or concerning it in any way.

In answer to the forty-fourth cross-interrogatory. I know of no party or parties interested in Winans' patent, except himself.

In answer to the forty-fifth cross-interrogatory. I do not think that the Comet was the latest eight-wheel passenger-car placed on the road and run, prior to October 1, 1834.

In answer to the forty-sixth cross-interrogatory. The Washington cars were commenced in 1834; but I know they were finished for the opening of that road, which took place the twenty-fifth August, 1835.

In answer to cross-interrogatory forty-six and one half. I cannot say that the car Comet was a failure, although defective in the arrangement of the body, and subsequently modified in that particular. She remained, I think, but a short time in her original form: how long she continued upon the road is not within my present recollection.

In answer to the forty-seventh cross-interrogatory. In 1829, short portions of the track of the Baltimore and Ohio Railroad were laid down, and in that autumn experiments were made in carrying passengers, in cars of four wheels, on about one and one-half miles of the road within the corporate limits of Baltimore city. This piece of track was so formed that the flanges of the car-wheels plied outside of the rails. On my appointment as chief-engineer, January 1, 1830, a change was recommended, and the rails re-adjusted to the running of the flanges upon the inner side; upon which plan the road was opened to Ellicott's Mills, thirteen miles, on the twenty-second of May of that year, anterior to the running of the first eight-wheel car.

In answer to the forty-eighth cross-interrogatory. In answer to this forty-eighth and final interrogatory, I reply, that I have not seen any of the interrogatories put to me on behalf of the Plaintiff, before this examination.

J. KNIGHT.

Affirmed to and subscribed before me.

JOHN FREEMAN, *Commissioner.*

STATE OF PENNSYLVANIA, }
WASHINGTON COUNTY, ss. }

I, John Freeman, the Commissioner named in the annexed Commission, do hereby certify, that Jonathan Knight, the foregoing witness, being present before me, I examined him carefully, on his solemn affirmation, touching the premises; which examination I have caused to be reduced to writing and subscribed in my presence by the said

witness. And I do further certify, that neither party was present at the taking of the deposition, either personally or by attorney or agent; nor were any communications made with the Deponent whilst giving his deposition; which deposition was taken in a place separate and apart, no person being present during the examination except the Deponent, myself, and D. S. Wilson, a disinterested person, whom I thought proper to appoint as a clerk, to assist in reducing the deposition to writing. And I do further certify, that I am not of Counsel for either of the parties, and that each direction or instruction contained in said Commission has been fully complied with.

In testimony whereof, I have hereunto set my hand and seal, this twenty-second day of July, 1853.

JOHN FREEMAN,

*Commissioner, and Associate Justice for the
Court of Common Pleas, in and for the
County aforesaid.*

ROSS WINANS vs. EASTERN RAILROAD COMPANY.

IN THE CIRCUIT COURT OF THE UNITED STATES }
WITHIN AND FOR THE DISTRICT OF MASSACHUSETTS. }

JOHN ELGAR, being produced this twenty-fifth day of February, A.D. 1854, as a witness on behalf of the Plaintiff in this cause, and being carefully cautioned and affirmed to tell the truth, the whole truth, and nothing but the truth, depose, in answer to the interrogatories exhibited to him on behalf of said Plaintiff, as follows:—

1. To the first interrogatory. My name is John Elgar; I am sixty-nine years of age; I reside in the city of Baltimore in the State of Maryland; I am engineer of machinery, and have been so occupied since eighteen hundred and thirty, principally in Baltimore.

2. To the second interrogatory. I was employed by the Baltimore and Ohio Railroad Company, as assistant engineer of machinery in the month of March, eighteen hundred and thirty, and continued in that position until July eighteen hundred and thirty-two.

3. To the third interrogatory. I do know the Complainant, Ross Winans. My acquaintance commenced with him in June, eighteen hundred and thirty; and I understood he was taken into the service of the Baltimore and Ohio Railroad, as assistant engineer of machinery at that time; and when I left the service of said company in July 1832, Mr. Winans was still there.

4. To the fourth interrogatory. I was not cognizant of the manner in which the business of the said company was conducted by its different officers; except that branch that was comprised within the duties of my station, which duties consisted principally in having chilled cast-iron wheels manufactured, superintending the construction of the running gear and wood work of the cars, planning and having executed the turn-outs on the road. There was employed under my direction a head carpenter in the wood-workshop, and a foreman in the construction of turn-outs.

5. To the fifth interrogatory. The knowledge of engineers, in regard to the construction of railroads and their machinery, has advanced to a considerable degree since the commencement of the Baltimore and Ohio Railroad Company. Their experience at that time was little or none. There was then in operation the Mauch Chunk Railroad, which I had seen. I am aware that a commission of engineers was sent by the Baltimore and Ohio Railroad Company to England, immediately after the commencement of said road to obtain information in regard to railroads and their machinery.

6. To the sixth interrogatory. The construction of the Baltimore and Ohio Railway track differed but little from that of the Mauch Chunk Railroad; the chief difference was, that the former was made much wider between the rails than the latter; and the reason for this increase of width in the Baltimore and Ohio Railroad was, to obtain a greater capacity and stability in the cars; and the track conformed in width with that which was adopted for railroads in England.

7. To the seventh interrogatory. In comparing the Baltimore and Ohio Railroad with other railroads then in use, in regard to the adaptation of machinery to roll on them, I will omit the Mauch Chunk Railroad as wholly inadequate to public transportation, and go to the English public railroads. The Baltimore and Ohio Railroad was constructed with numerous curves of short radius, from four to six hundred feet, while the English railroads varied but little from straight lines; and the machinery the best adapted to straight lines, by the long coupling of their running gear, cannot be used on a road with short curves to any advantage; therefore, a modification of the locomotive engines and cars was required. The curvatures of short radius demanded a closer coupling in the running gear. Whilst the wheels and axles in an English car were ten or more feet asunder, the curves in the Baltimore and Ohio Railroad required the axles to be but about four feet asunder.

8. To the eighth interrogatory. There was an experiment made under the direction of the chief engineer, Jonathan Knight, to adapt the wheels and running gear to curves of short radius, which was to form a particular cone on the tread of the wheel next to the flange; which experiment answered a good purpose.

The next improvement was the eight-wheel passenger and burden-car; and the first attempt in the eight-wheel passenger-car was made in the car called the Columbus; after trying a number of experiments with different forms of eight-wheel cars, the plan adopted in the Washington cars, built in 1834 and 1835, combined all the advantages hoped for in the eight-wheel car, in its adaptation to railroads of many and short curvatures.

These experiments and improvements in regard to the eight-wheel car were made by Ross Winans, the Plaintiff, and executed under his direction.

9. To the ninth interrogatory. In 1831, I think, the first eight-wheel car, called the Columbus, was placed upon the Baltimore and Ohio Railroad. This car was built under the direction of Ross Winans, the Plaintiff.

10. To the tenth interrogatory. It was certainly a novelty, and so considered; and the novelty consisted in its great length, and being mounted on eight-wheels.

11. To the eleventh interrogatory. I have looked at the drawing annexed, marked "Columbus," and I think it represents the first eight-wheel car called the Columbus.

12. To the twelfth interrogatory. There were other eight-wheel cars constructed, but I think not on the plans and proportions of the car Columbus. Having left Baltimore in eighteen hundred and thirty-two, I saw those cars but transiently on visits to that place. Afterwards there were three or four whose plans and construction differed from each other.

13. To the thirteenth interrogatory. I think the Washington Branch Railroad was opened for use in the summer of eighteen hundred and thirty-five.

[Adjourned to Monday, the 27th February.]

Monday, Feb. 27th, A. D. 1854. The deposition of John Elgar resumed.

14. To the fourteenth interrogatory. Since giving my answer to the twelfth interrogatory, I now recollect I was employed at Baltimore for a few months by the Baltimore and Ohio Railroad Company, in superintending some work at the Mount Clare Depot, in the early part of the year eighteen hundred and thirty-five, during which time I gave some attention to the mode on which the cars were being constructed for the Washington Branch Railroad. And as to the mode and construction of other eight-wheel cars, I recollect one car that I think was called the Dromedary, in which the body was suspended between the forward and hindward truck, with a projection from each end of the body, resting on the trucks, so as to come down within a few inches of the rail-track, the two trucks being at the extreme ends of the body. There was another eight-wheeled car I noticed upon the road, I think called the Winchester; the body of this car appeared to be constructed in the form of several coach-bodies attached together in one frame. I do not know who designed those cars. All the eight-wheel cars I then saw upon the road were passenger-cars.

The particular reasons in varying the plan in the construction of these several cars, I can only now state what I believe to be the object in regard to the peculiar plan of the Dromedary; the principal object was safety, by the low suspension of the body, and in this car there was a material change in the position of the trucks from that of the Columbus. In the latter, the trucks were placed much farther from each end of the body; that is, the two trucks were brought nearer together. Whereas in the former, they were placed as far apart as circumstances would permit.

15. To the fifteenth interrogatory. I have looked at the drawing marked "*car Dromedary*," and it appears to be a true representation of that car.

16. To the sixteenth interrogatory. I have looked at the drawing called "car Comet;" and I now recollect the general form of said car, and believe the drawing to be a true representation thereof.

17. To the seventeenth interrogatory. In looking at the position of the trucks under the car Columbus, I conceive that experiments might be necessary to ascertain the best position of the trucks; that is, whether the trucks should not be placed nearer the ends of the car-body, and whether the position of the wheels and axles in each separate truck should not be brought nearer together. My impression is, that the experiments necessary to obtain the desired perfection in the proportion and arrangement of the several parts, were conducted by the Plaintiff, Ross Winans.

18. To the eighteenth interrogatory. I became familiar with the plan of the Washington cars while they were being built at the shops adjoining the Pratt-street depot, in the early part of the year eighteen hundred and thirty-five. I think they were first used on the Washington Branch Railroad, at the opening of said road, in the mid-summer of that year.

They were designed, and their construction superintended, by the Plaintiff, Ross Winans.

19. To the nineteenth interrogatory. What I noticed as new in the Washington cars, was the double framing of the lower part of the body, for the purpose of procuring strength and lightness. The bodies were long, and the trucks were placed very near each end, and the wheels in each truck very near together. I cannot see that they differed in principles of construction and arrangement from the cars now in common use, except perhaps the double framing of the lower part of the body is now omitted.

20. To the twentieth interrogatory. My earliest recollection of the eight-wheel freight-cars was in the fall of eighteen hundred and thirty-five; and I think they were used on the Washington Branch for hauling cord-wood.

21. To the twenty-first interrogatory. I fully believe the Plaintiff (Ross Winans) was the inventor of the eight-wheel cars used upon the Baltimore and Ohio Railroad. My belief is founded on the following circumstance: The drawing of the car Columbus, I think, was made by him, or under his direction; his close attention to the construction of said car, and his activity in the arrangement of the Washington cars.

22. To the twenty-second interrogatory. The advantages possessed by the eight-wheel car over the four-wheel car consist, I conceive, first, in much greater stability and smoothness of motion, which is due to the great length of the body and the subdivision of vertical motion obtained by resting each end of the body on the centre of the trucks. The second is, the greater facility in passing curves of short radius, which is due to the proximity of the wheels and axles of each separate truck. Thirdly, the safety to passengers is much greater, owing to the number of wheels under the same body.

The contrast to these advantages in the four-wheel car are, first, the axles and wheels may not be so close to each other because of the

instability that would be produced in the motion of the body. And if the wheels are placed far apart in the same car, it is unadapted to passing curves of short radius. And, second, the danger from a broken wheel being much greater, I think the same safety and comfort cannot be had at half the velocity of the eight-wheel car, unless the road should be nearly a straight line.

23. To the twenty-third interrogatory. I have no knowledge of the intention of the Plaintiff to apply for Letters Patent for the said eight-wheel car.

24. To the twenty-fourth interrogatory. I have examined the Letters Patent and specification hereto annexed, issued to the Plaintiff Ross Winans, dated "Oct. 1, 1834, for an improvement in the construction of cars or carriages for railroads" (page 3), and I think the specification is a sufficient guide to enable one skilled in the art to which it appertains, to construct a car containing said improvement, suitable for the transportation of passengers or freight, at the customary speed of twenty miles per hour.

25. To the twenty-fifth interrogatory. I think a car constructed according to the drawing and specification hereto annexed, marked A. (see drawing A.), shows the advantages claimed to be given by the improvement described in the text of the specification aforesaid. I have had many cars constructed under my direction, and am familiar with the action and principles of construction of both the four-wheel cars and the eight-wheel cars.

26. To the twenty-sixth interrogatory. I think the eight-wheel cars in general use conform very nearly, in their arrangement and principles of action, to the description in said Letters Patent.

27. To the twenty-seventh interrogatory. I think what is new, as secured to the Plaintiff by said Letters Patent, is, first, the close proximity of the axles and wheels of the truck. Secondly, placing the two trucks as near the ends of the long body as is convenient. And, thirdly, attaching the draught to the body of the car instead of the truck.

28. To the twenty-eighth interrogatory. The distance between the axles of a four-wheeled car is regulated by the character of the road on which it is used. If the road is straight, or nearly so, the wheels and axles may be placed as far apart as convenience in the construction of the body may dictate; that is, the body may be long and the wheels placed near the ends. If it is a road containing curves of short radius, the wheels must be placed near together, and the body must be necessarily shorter.

29. To the twenty-ninth interrogatory. The position of the axles of a four-wheeled car furnish the greatest steadiness when placed near or at the ends of the body.

30. To the thirtieth interrogatory. The chief engineer (Jonathan Knight) and myself determined the proportions of the four-wheeled cars used on said railroad.

I do not recollect the precise length of the bodies; but as the axles had to be placed near together,—but about four feet apart,—the bodies were necessarily short. The diameter of the wheels was two

feet six inches. These proportions were determined by the numerous curves of short radius that existed in said railroad.

31. To the thirty-first interrogatory. The minimum radius of curves on said road was about four hundred feet. The weight of the plate-rail then used on said road, I think, was fourteen pounds per yard.

32. To the thirty-second interrogatory. This I cannot answer.

33. To the thirty-third interrogatory. Conduce Gatch was brought into the service of said company by my recommendation. His position was that of foreman of the shops at Mount Clare Depot, in which the woodwork of the cars was executed. His duty was to have the work done as directed by the engineers.

34. To the thirty-fourth interrogatory. I was never apprised, nor did I know while I was in the employ of said company, that said Gatch had authority to have any work done in the company's shops, except under the orders and directions of the engineers.

35. To the thirty-fifth interrogatory. I have examined the description and drawing of the Messrs. Chapman's six and eight-wheel *locomotive engines* inquired for. I do not see in either of those engines the principles and arrangements embodied and described in the Plaintiff's specification annexed to the patent issued to him October 1, 1834, for the *eight-wheel car*. The eight-wheel *engine* described by Chapman is placed upon two trucks, or bearing carriages, the wheels of which are separated too widely to act properly in curves of a short radius, and the trucks are too contiguous to each other. All the eight wheels being equi-distant, it is evident that the six wheels and the eight wheels were proposed, and it is so stated in the description of these engines, with the sole view of relieving a weak and insufficient track by distributing the weight on eight points instead of four, of course spreading over a greater space of road.

While the object of the Plaintiff Ross Winans, as shown in his specification, was solely to improve the carriage as it rolls upon the railway, the objects to be accomplished by the two inventors (Chapman and Winans) being entirely different, the result of their inventions differs accordingly.

36. To the thirty-sixth interrogatory. I have examined the treatise on railroads and carriages by Thomas Tredgold, published in London in 1825, and find in it a suggestion and a drawing relating to an eight-wheeled carriage composed of two four-wheeled trucks, all the eight wheels being equi-distant and too widely separated in the trucks to be adapted to roads with short curvatures; the load resting on a transverse axis in the middle of each truck, so as to permit a *vertical rocking* between the body and the trucks, which will permit each truck to conform readily to the variations in the surface-line of the road.

There is no provision proposed for *lateral swivelling*; hence it is evident, that the whole design was to carry a double load with no more stress to the road than would occur from a four-wheeled car carrying a single load. Practically, the plan would effect but little else. The invention, therefore, does not embrace the principles of Plaintiff's invention, as claimed in his patent, for the eight-wheel car.

37. To the thirty-seventh interrogatory. I have examined a practical treatise on railroads, by Nicholas Wood, published in London 1825, and find the only allusions to eight-wheel carriages are in reference to Chapman's and the Wylam locomotive engines. The Wylam engine is supported on eight wheels, all the wheels being equi-distant and the axles connected by cog-wheels, working into each other, through which the power is communicated to all the road-wheels. By this arrangement any lateral action is limited to a very small degree. Therefore the engine was not adapted to roads with curvatures of short radius. The Chapman engine also has eight wheels, placed equi-distant, but divided into two four-wheeled trucks, with a provision for swivelling. This engine, as well as the other eight-wheeled engines and cars hereinbefore described, it is evident to me, was designed to relieve the road; nor does it exhibit the essential proportions claimed in the said Plaintiff Ross Winans' patent, to wit: the close proximity of the truck-wheels to each other, and the wide separation of the trucks. And there is nothing to show that the draught was attached to the frame of the engine, which is an essential part of the Plaintiff's invention.

38. To the thirty-eighth interrogatory. I have read the specification of Letters Patent granted to Ephraim Morris, Oct. 13, 1829, for a mode of raising canal boats, &c., &c. The specification does not describe a railroad-car such as is specified in the Letters Patent issued to the said Ross Winans, October 1, 1834. There is no provision described for swivelling laterally, and no other arrangement suitable for an eight-wheel railroad-car, except the employment of eight wheels, separated into two four-wheeled trucks.

39. To the thirty-ninth interrogatory. I have no knowledge of Fairlamb's patent.

40. To the fortieth interrogatory. Two four-wheeled cars connected temporarily is not a permanently combined machine; and though in action it exhibits some of the advantages, that of swivelling for instance, it loses the essential advantage of being drawn by the body instead of the running gear.

41. To the forty-first interrogatory. I think the six-wheeled locomotive engine does not combine the advantages of the Plaintiff's eight-wheeled car, because the axle of the driving wheels, in the six-wheel engine, being fixed permanently under one end of the engine-frame, and the truck swivelling under the other end, their action in passing curves must be antagonistic, as the truck, by the action of its flanges against the outer rail of the curve, compels the driving wheels to slide through the leverage of the engine-frame in conformity to the curve, and the force necessary to produce this sliding reacts upon the flanges of the truck-wheels, pressing them against the outer rail, which antagonism does not exist in the Plaintiff's car.

42. To the forty-second interrogatory. I may state, in addition, that I am aware from actual observation, that in 1835 the then modern railroads in England, which carried passengers, were so nearly straight, that four-wheeled cars were successfully used upon them, at the speed of thirty miles per hour, having their axles ten feet or more apart;

while at that time the two principal railroads of this country, to wit, the Baltimore and Ohio, and the Columbia and Philadelphia, had numerous curvatures of such short radius, that it was necessary to limit the distance apart of the axles of four-wheeled cars, to five feet or less, and which could not be used safely at a speed of more than twenty miles an hour: hence the necessity of adopting a different proportion and arrangement in the cars used here; and this, I fully believe, led to the invention of the Plaintiff's eight-wheeled car. I would further state, as indicated in the Plaintiff's patent, the essential principle of connecting the draught with the body of the car, instead of the running gear, the importance of which is shown most strikingly in this mode of connection, applied through a train of eight-wheel cars, as it leaves the trucks throughout the train to act with freedom; which principle, I think, is not shown in the eight-wheel engines and cars invented in England, and herein described.

To the cross-interrogatories he answers as follows:—

X 1. To the first cross-interrogatory. From the exercise of mind upon the subject, I can now recollect circumstances I did not recall when I answered the fourth direct interrogatory. I can now state that the duties of the President and of the chief engineer were general, and that the subordinate officers had specific duties. The directors became acquainted with the affairs of the company, through the reports of the officers and from observation. This is stated from my own knowledge.

X 2. To the second cross-interrogatory. I have no copies of such reports or papers to spare, excepting my own, hereto annexed, A. and B.

X 3. To the third cross-interrogatory. I am not aware that any of those reports were printed, except in pamphlet-form, for the use of the stockholders. I am the author of some of those Reports, printed 1830 and 1831.

X 4. To the fourth cross-interrogatory. I can state that from my first connection with the company, in the spring of 1830 to July 1832, there were shops in which the different branches of car-building was carried on, to wit, a carpenters' shop, a smiths' shop, and a shop for the construction and repair of passenger car-bodies.

Conduce Gatch was the foreman of all those shops.

X 5. To the fifth cross-interrogatory. Conduce Gatch, Michael Glenn, Jacob Rupp, and W. O. Frost, worked in the carpenters' shop; Leonard Forrest and his assistants, in the smiths' shop; Oliver Cromwell and Francis Gatch, in the repairing shop: John Eichelberger was painter. These are all the workmen I now recollect.

X 6. To the sixth cross-interrogatory. I became acquainted with George Gillingham in eighteen hundred and twenty-eight. He was appointed superintendent of machinery, I think, in eighteen hundred and thirty-three. He is dead.

X 7. To the seventh cross-interrogatory. Jonathan Knight was the chief engineer of the Baltimore and Ohio Railroad Company.

X 8. To the eighth cross-interrogatory. I am acquainted with Ross Winans. I have no knowledge of his wealth, or what he is reputed to be worth, or what he has stated he was worth.

X 9. To the ninth cross-interrogatory. The corner-stone of the Baltimore and Ohio Railroad was laid the fourth of July, 1828. I was not acquainted with any American engineers prior to that date. I cannot undertake to affirm to the experience of any engineer at that time. I cannot state that at that time I possessed much knowledge and experience in engineering.

X 10. To the tenth cross-interrogatory. I referred to the Mauch Chunk Railroad, which I had examined. My knowledge of other roads was derived from publications by Wood, Tredgold, and others. The measurement by feet and inches is not recollected.

X 11. To the eleventh cross-interrogatory. I saw running gear in use on the Mauch Chunk Railroad, which were small four-wheeled coal-cars, with very low wheels and small axles; and I also had knowledge of the running gear of burden-cars used on the Liverpool and Manchester Railroad. A set of running gear was sent here from that place in 1828 or 1829. I also had knowledge of English cars from books and drawings.

X 12. To the twelfth cross-interrogatory. I consider any thing as freight that may be hauled on a railroad, except passengers. I have no knowledge of any eight-wheeled car, properly so called, for hauling any kind of freight, prior to the construction of the eight-wheeled car Columbus, which was built and put to trial early in eighteen hundred and thirty-one.

X 13. To the thirteenth cross-interrogatory. Ross Winans and myself had a general supervision of all the workshops, but said Winans had particular oversight of the building of the eight-wheeled car Columbus. This answer is of my own knowledge.

X 14. To the fourteenth cross-interrogatory. To the best of my recollection, it was built by the following persons, to wit: Conduce Gatch and his men built the trucks in the carpenters' shop, and Oliver Cromwell and Francis Gatch built the body; and Leonard Forrest did the smith-work. The wheels and axles of said car were not made at the company's shops. I cannot state any specific directions having been given, except those communicated through drawings, which I understood and believed, and do now believe, were furnished by Plaintiff.

X 15. To the fifteenth cross-interrogatory. Not any to my knowledge.

X 16. To the sixteenth cross-interrogatory. I am not aware that any eight-wheeled cars were employed to haul timber on said road prior to eighteen hundred and thirty-five. In the spring of 1830, two four-wheeled cars, such as were then used for hauling stone and gravel for the construction of the railroad, were supplied with a bolster on the middle of each, upon which bolsters ark-timber from sixty to eighty feet in length was loaded; the load requiring the coupling of the two cars.

X 17. To the seventeenth cross-interrogatory. I am not aware that

eight-wheeled cars were used on said road prior to the use of the car Columbus.

X 18. To the eighteenth cross-interrogatory. I first saw the car Columbus, in the fore-part of the year eighteen hundred and thirty-one. It made trips to Ellicott's Mills in the summer of that year.

X 18. To the *second* eighteenth cross-interrogatory. I do not recollect that I made any measurements of said car.

X 19. To the nineteenth cross-interrogatory. I made such answers from knowledge obtained by observation, and from publications. I made no measurements that I now recollect.

X 20. To the twentieth cross-interrogatory. I think there was an alteration made in the running gear of the car Columbus, by a change from revolving friction wheel boxes to plain chilled boxes.

X 21. To the twenty-first cross-interrogatory. I have no recollection by whom the alteration was made.

X 22. To the twenty-second cross-interrogatory. I believe the original trucks are truly represented in the drawing. I know of no alteration having been made in the running gear, except the change in the boxes mentioned in my answer to the twentieth cross-interrogatory.

X 23. To the twenty-third cross-interrogatory. I made no measurements that I recollect of the car Columbus; therefore cannot state its dimensions. It was drawn by a perch attached to the middle of the truck-frame. The diameter of the wheels was the same as those used in the four-wheeled cars in use at that time; which was thirty inches across the tread, and thirty-two and a half inches across the flange. I think the play between the flanges of the wheels and the rail was one and three quarter inches. I do not recollect the particulars of other measurements, inquired of in this cross-interrogatory.

X 24. To the twenty-fourth cross-interrogatory. I refer to my answers to the twentieth and twenty-second cross-interrogatories.

X 25. To the twenty-fifth cross-interrogatory. I understand the concentric circles shown in the plan of the Columbus, as intended to represent the plates upon which the bolsters of the body were to swivel.

X 26. To the twenty-sixth cross-interrogatory. I rode upon the top of said car Columbus, in the summer of 1831; but I have now no recollection of the railing around the top.

X 27. To the twenty-seventh cross-interrogatory. I saw no other cars made on the plan and proportions of the Columbus.

X 28. To the twenty-eighth cross-interrogatory. I made no measurements of the Dromedary or the Winchester cars: my knowledge is derived from observation. The wheels were of the same dimensions as stated in my answer to the twenty-third cross-interrogatory.

X 29. To the twenty-ninth cross-interrogatory. I cannot state who designed said cars, nor did I see any drawings of them, as I now recollect. While said cars were being built, I was mostly absent from Baltimore, being employed on other railroads. My visits to Baltimore were transient during that time, but I recollect riding in the Dromedary. What I have stated in my answer to the fourteenth direct interrogatory was of my own knowledge.

X 30. To the thirtieth cross-interrogatory. I refer to my answers to the twenty-eighth and twenty-ninth cross-interrogatories.

X 31. To the thirty-first cross-interrogatory. I refer to my answers to the twenty-eighth and twenty-ninth cross interrogatories.

X 32. To the thirty-second cross-interrogatory. I cannot state what the exact proportions of the eight-wheeled cars in common use are. They appear to be constructed on the same principles which are contained in the Washington cars. I think it was necessary to ascertain by experiments the best form and proportion the eight-wheel car was capable of. In my opinion, the car Columbus was deficient in the following particulars, to wit: the wheels of the truck were placed too far apart for the trucks to perform well on a road with numerous curves of short radius, as was then the character of the Baltimore and Ohio Railroad. The trucks were placed too far from the ends of the body to ensure smoothness of motion in the passage of the car. Experience showed that the trucks should be placed near the ends of the body, and the draught was taken from the truck, which put a constraint upon the free action of the running gear.

The Columbus was built, I believe, without springs, which are essential to a well-organized eight-wheel car. These defects were not known till after the trial of the Columbus.

The dimensions and proportions of parts of the eight-wheeled car should vary in some degree, as the character of the different roads vary, and yet retain the essential principles which should govern its construction in all cases. On a road with curvatures of short radius, the trucks should have the wheels near together, and the body should not be very long. As a road approaches comparatively a straight line, the body may be extended in length, and the wheels composing the trucks may be larger in diameter and placed farther apart, which would also be some relief to the road, by spreading the points of bearing.

X 33. To the thirty-third cross-interrogatory. Says, I refer to my answer to the twenty-third cross-interrogatory.

X 33 $\frac{1}{2}$. To the thirty-third and a half cross-interrogatory. The car Columbus was used for public travel but seldom, its action not being satisfactory: further I do not recollect.

X 34. To the thirty-fourth cross-interrogatory. I cannot recollect having seen a design of the Washington cars: my knowledge is from seeing them while being built, and after they were finished. I made no measurements, and therefore cannot state the precise difference in their proportions from other cars.

My attention was arrested by the new plan and light construction of the body, and the mode of its resting on iron bolsters, with friction wheels on their ends, to facilitate the swivelling. I did not pay attention to the trucks as I now recollect. I do not know when the building of them was commenced. George Gillingham, as superintendent of machinery, had a general charge of the shops and workmen, to execute work designed by the engineers.

I do recollect seeing Jacob Rupp there employed, but I do not recollect the name of any other of the workmen.

X 35. To the thirty-fifth cross-interrogatory. I have no recollection of the time when I last saw the Columbus, or when I last saw her in use. She went into use in the year 1831.

X 36. To the thirty-sixth cross-interrogatory. I am not.

X 37. To the thirty-seventh cross-interrogatory. I have no knowledge of these facts, being absent from Baltimore at that time.

X 38. To the thirty-eighth cross-interrogatory. I have no knowledge of the subject.

X 39. To the thirty-ninth cross-interrogatory. Four feet eight inches and a half.

X 40. To the fortieth cross-interrogatory. Conduce Gatch was employed by the Baltimore and Ohio Railroad, at my suggestion, as head carpenter and foreman of the shops, and was directed by the company, his employers, to follow my instructions in regard to the work to be done in those shops; and, during the time I was in the employ of said company, I did not observe that he exercised any authority in regard to the plans or designs of the work which I had in charge. As to the relation between him and George Gillingham, or any other persons after I left the company, I cannot say.

X 41. To the forty-first cross-interrogatory. I am aware that Conduce Gatch did buy materials under my direction as to quality and size, and that he hired men and superintended them as he was employed to do. He assisted the men in the work; but it was not his duty, nor did he exercise any authority in the plans and modes of constructing the cars. I do not recollect to have heard any orders given to the said Gatch, except from the engineer, and those given by the directors at the time of his appointment.

X 42. To the forty-second cross-interrogatory. I cannot say when the car Columbus first began to run. I recollect riding upon her in the mid-summer of 1831. I know but little about the cars Dromedary, Winchester, and Comet, being mostly absent while they were being constructed and in use. I rode once in the Dromedary. I recollect their general form.

X 43. To the forty-third cross-interrogatory. I was twice in the employment of Ross Winans, as his assistant in his business. Have no expectation of again being in his employ. Nor am I now. I have not been in the employ (knowingly), nor am I, nor do I expect to be, of any other person interested in the said Winans' patent of October 1st, 1834. I have no interest whatever, direct or indirect, in said patent, or in its success, or concerning it in any way.

X 44. To the forty-fourth cross-interrogatory. I know of no parties interested in said patent, except the Plaintiff, Ross Winans.

X 45. To the forty-fifth cross-interrogatory. I do not know, being absent from Baltimore.

X 46. To the forty-sixth cross-interrogatory. I think the Washington cars were built in the winter and spring of the year 1834-35.

X 46½. To the forty-sixth and a half cross-interrogatory. I have no knowledge of the matters inquired for.

X 47. To the forty-seventh cross-interrogatory. There was about a mile of track laid suitable for the flanges of the wheels to run outside

of the rail in the fall of 1829, on which two or three cars were tried as an experiment. In the spring of 1830, this track was changed so as to suit flanges working inside of the rails. No passenger-cars were run regularly until the road was open to Ellicott's Mills, in the month of May, 1830.

X 48. To the forty-eighth cross-interrogatory. I have not.

JOHN ELGAR.

GEORGE BROWN, being produced this seventh day of March, A.D. 1854, as a witness on behalf of the Plaintiff in this cause; and being carefully cautioned, and sworn to tell the whole truth and nothing but the truth, deposeeth in answer to the interrogatories exhibited to him on behalf of said Plaintiff, as follows:—

1. To the first interrogatory. I am sixty-seven years old; have resided in Baltimore City and Baltimore County, and conduct a banking and other general business.

2. To the second interrogatory. From the commencement of the Baltimore and Ohio Railroad Company in eighteen hundred and twenty-seven, to eighteen hundred and thirty-four, I was treasurer of the company, without compensation. Since that period, I have been nearly the whole time a director of the company.

3. To the third interrogatory. The company had different agents or officers to attend to the several departments, and it was left almost altogether to the President to regulate the duties of said agents.

4. To the fourth interrogatory. I knew of no railroads in this country at the commencement of the Baltimore and Ohio Railroad Company, except the Mauch Chunk and the Quincy, and I do not know whether they took passengers, but think they did not. The Baltimore and Ohio Railroad was commenced on the fourth of July, in the year eighteen hundred and twenty-eight.

5. To the fifth interrogatory. Jonathan Knight was the chief engineer of the road; his principal assistants were Col. Long, General McNeill, Lieut. Whistler, and other subordinates.

6. To the sixth interrogatory. I have known Ross Winans, the Plaintiff, since about the year eighteen hundred and twenty-eight. He entered the service of the company about June, eighteen hundred and thirty. The company, believing him to be useful to them in perfecting the machinery of the road, employed him to superintend the machinery department.

7. To the seventh interrogatory. The form of cars were considered by the company to be of vital importance to the success of the road, and it was frequently and extensively discussed on the grounds that any improvements that could be made were desirable.

8. To the eighth interrogatory. I believe the first eight-wheel car built was the Columbus, which was placed, I think, on the road about eighteen hundred and thirty-one, as an experiment. I applied to the

Board of Directors to get leave to have it built at the company's shops ; and, after the car was put on the road and tried, I do not think any other eight-wheeled cars were built for passengers, constructed like the Columbus, without such improvements as Mr. Winans suggested.

The first suggestion in relation to an eight-wheel car, of which I have any recollection, occurred in a conversation between Ross Winans and myself, some space of time before the car Columbus was constructed.

I asked him whether eight-wheel cars would not be safer than four-wheel cars, and thus, as I suppose, first called his attention to the subject; but I did nothing more than this, and made no plan or design for such a car.

Soon afterwards, Ross Winans showed me a drawing of an eight-wheel car, and I was instrumental in obtaining the consent of the Board that an experimental car should be built therefrom. I took great interest in the progress of the road, and in the success of this eight-wheel car, and frequently saw and examined said experimental car (the Columbus) during its construction and afterwards.

9. To the ninth interrogatory. This is answered in the preceding eighth interrogatory, as far as I am able to answer it.

10. To the tenth interrogatory. I saw the plan of the car Columbus before and at the time it was being built, and also afterwards; and the drawing now shown to me, marked "Columbus," and annexed, is a copy of it, to the best of my belief. I do not know that it differs in any particular from the original. I do not remember when I last saw the original.

11. To the eleventh interrogatory. I am not aware that there were any other experiments made with eight-wheel cars on the road, except such as Ross Winans, the Plaintiff, superintended or gave the drawings for.

12. To the twelfth interrogatory. I have no doubt that Ross Winans is entitled to the credit of having invented the eight-wheel railroad-car in general use in this country; and my reason for saying so is, that he was in the habit of talking freely with me, and showing me his plans, and I think I signed the specifications to be lodged at the Patent Office. I also refer to my answer to the eighth interrogatory for a further reply to this interrogatory.

13. To the thirteenth interrogatory. I know Conduce Gatch: he was the foreman in the company's shops where the Columbus was built from a drawing made by the Plaintiff, Ross Winans; and which drawing was, I think, handed to said Gatch by me. I do not think that said Conduce Gatch had any authority to build cars without the direction of the President: what directions he may have received I do not know.

14. To the fourteenth interrogatory. I refer, for answer to this, to my answer to the thirteenth interrogatory.

15. To the fifteenth interrogatory. I know nothing further relating to the eight-wheel cars, of advantage to the said Winans.

of the rail in the fall of 1829, on which two or three cars were tried as an experiment. In the spring of 1830, this track was changed so as to suit flanges working inside of the rails. No passenger-cars were run regularly until the road was open to Ellicott's Mills, in the month of May, 1830.

X 48. To the forty-eighth cross-interrogatory. I have not.

JOHN ELGAR.

[J. ELGAR'S REPORT. — J. H., Com. — A.]

BALTIMORE, Sept. 27, 1830.

To J. Knight, Chief Engineer Baltimore and Ohio Railroad.

Having been appointed, in the early part of last spring, assistant engineer of machinery, it became my duty to procure the necessary patterns, castings, and smith-work for the company, and to superintend the construction of the cars. On entering upon the discharge of these duties, the various details confided to my care were attended to; and amongst others an iron pattern for casting the cone and cylindrical wheel, and the necessary chills were procured. Contracts were also entered into for the other requisite castings and smith-work of the cars.

In April, contracts were also made, and the necessary patterns furnished for casting thirty-two thousand knees for the stone blockways; this contract was fulfilled. The patterns, castings, and switches for twenty-three turn-outs, were also procured during this month. And to my other duties was added that of laying down these turn-outs on the first division of the road, thirteen of which were finished, and the road opened for travel on the 22d of May. In the mean time, the running gear for six friction-wheel cars were completed, and furnished to a contractor to be mounted with coach-bodies; the first of which, the Pioneer, was put on the road, and on the 22d of May led off the train to Ellicott's Mills.

The construction of the new burden-cars was now commenced, on the plan which had been introduced in the fall, of outside steel-pointed journals revolving in *chilled* cast-iron boxes; thirty of this kind, and six with friction-wheels, have been completed, and put to constant use in transporting stone sills and other materials for the second track, or employed in carrying freight to and from Ellicott's Mills. Five passenger-cars with chilled boxes, and four with friction-wheels, have also been constructed at the depot; which, with eight coaches lately furnished by contract, and three that were in use last year, make the complement of thirty-six burden and twenty passenger-cars now in active use.

It is thought that some improvement in the wheel-pattern is necessary to give full effect to the operation of the *chill* in communicating the hardening principle, though a number of the wheels have run from four to five thousand miles without much perceptible wear.

A car has been constructed with the side-pieces of the frame, which rest on the bearings so long and slender as to be elastic, and yet of sufficient strength to bear a load of two tons. The result of this experiment has shown the importance of having springs immediately at the journals or bearings of a burden-car of rapid motion, as well as to passenger-cars. The concussion of the wheels upon the inequalities of the rail is diminished considerably by it; the plan is cheap and simple, and it is believed might be used with advantage until steel springs may be adopted.

An improvement has also been made in the turn-out, which combines several advantages over those heretofore used. On this plan only one switch is required, which makes it unnecessary to have any projection below the surface of the road, to be obstructed by ice or other matters. The switch cannot be injured by the operation of the car-wheel opening or closing it, nor can the car be injured from a neglect to move the switch by hand; either can only be disordered by the too rapid motion of the car when entering the turn-out. The car moves through at a slow motion without much resistance, and is subject to very little strain and consequent wear. — Respectfully,

J. ELGAR, *Assistant Engineer of Machinery.*

[J. ELGAR'S REPORT.—J. H., *Com.*—B.]

ENGINEERS' OFFICE, BALTIMORE AND OHIO RAILROAD,
September 30, 1831.

To J. Knight, Chief Engineer.

The construction of the machinery connected with the moving power upon the railway committed to my charge, has been carried to the extent required, and consistently with its faithful and advantageous execution; and various improvements have been made in the forms and proportions, as well as in the texture, of the parts liable to breaking or wearing.

The improved turn-out, which was adopted last year and adverted to in my last annual communication, has been found to answer the end for which it was designed. This improvement was effected by employing only one switch instead of two, as previously used, and by placing this one in the interior rail of the turn-out, which, when open to a certain limited extent, formed a groove through the rail of the direct track; through this groove the flange of the wheel is directed by the switch, whilst the change in direction of the motion of the carriage is also aided by means of the flange of the opposite wheel rolling upon a *hard* cast-iron plate.

During the last year, the castings and switches of these turn-outs have been modified in their dimensions, so as to permit of the same width of track at the turn-outs as in other parts of the railway, to wit, four feet nine and a quarter inches, and so that the play of one and three-

quarter inches for the flanges would be uniform throughout the road; this required the castings and switches to be increased in length to five feet, and is found to be an improvement, the cars passing through these turn-outs with facility and without danger from accidents. Such modifications also in the wheels and axles as experience indicated to be necessary, have been attended to according to instructions, and these parts have been increased in weight and durability. Many experiments have been made with regard to the chilling of the wheels, several of which have resulted favorably, and good wheels are now made. An attempt has been made to ascertain the practicability of increasing the strength of the wheel without adding to its weight, by casting it with an interior flange attached to the rim on the side opposite to the exterior flange: this experiment promises success.

The diameter of the journal of the axle, which revolves in the chill-box, is two inches; and from the circumstance that no appearances of failure have been observed after twelve months' use, it is believed that a diameter of one and three-quarter inches may be employed to advantage. The chill cast-iron box-work and the steel journal work well together, and are very durable; and no apprehension is entertained from a want of strength or of rubbing surface, in case of the reduction in size as proposed.

Various improvements having shown the decided advantage possessed in the friction-wheel car over the present chilled-box car, in passing through the curves of the railway, in consequence of the vibration of the axles of the former permitting a more full effect to the action of the cone, an attempt has been made to extend that principle to the latter. A car has accordingly been fitted up in such a manner as to admit the box to move through short distances, as the axles should vary from parallelism. This car moves through the curves with much increased facility, but sufficient experiments have not been made to ascertain with precision its relative merits. The turn-out and curved way at Ellicott's Mills, directed to be laid down with a radius of sixty feet, intended to be traversed by the action of the wheel rolling on its flange, has just been completed, and experiments with two loaded carriages have been made to ascertain the traction required in this curve; the result is that the traction was the 1-49 with the Winans car, and 1-45 with the chilled-box car. It may be remarked, that the near approach to equality of force required for each of the two carriages in this experiment, arises from the resistance in either car being principally at the flanges of the wheels, the curvature being too great to be accommodated by the extent of vibration allowed in the axles of the friction-wheel car. In passing a curve of sixty foot radius, under these circumstances, the advantage of the Winans car over the chilled-box car, in lessening the resistance of the journals, is therefore diminished by as much as the resistance is augmented at the flanges. — Respectfully,

J. ELGAR, *Assistant Engineer of Machinery.*

(*For Interrogatories, see p. 208.*)

BENJAMIN H. LATROBE, one of the witnesses named in said Commission, being duly sworn on this 31st day of March, A. D. 1854, and carefully examined on the interrogatories and cross-interrogatories addressed and propounded to him, and annexed to said Commission, and being examined on behalf of the Complainant in the said cause, deposes and says, as follows:—

1. To the first interrogatory on behalf of the Complainant, he says: My name is Benjamin H. Latrobe. I am forty-seven years of age. I reside in Baltimore. I am by profession a civil engineer. I have been in that profession about twenty-four years, and chiefly in the States of Maryland and Virginia.

2. To the second interrogatory on behalf of the Complainant, he says: I have been in the service of the Baltimore and Ohio Railroad Company since July, 1830, with the exception of one year from July, 1835, to July, 1836. Prior to 1836, I was an assistant of Jonathan Knight, chief engineer, in various grades; and from 1832 to 1835, his principal assistant. From 1836 to 1842, I was engineer of location and construction; and, since then to this time, chief engineer, which place I now hold.

3. To the third interrogatory on behalf of the Complainant, he says: I know Ross Winans, the Complainant in this cause, and have known him since 1830; at which time, and for some years after, he was in the employment of the Baltimore and Ohio Railroad Company, as an assistant engineer of machinery, employed in planning and improving the cars, engines, &c. of the said company.

4. To the fourth interrogatory on behalf of the Complainant, he says: The service of the company was divided into departments, at the head of each of which was an officer with a specific duty; and he, in person and by his assistants, performed the business of his department. The directors were made acquainted with the proceedings of their officers and agents, by official reports and personal intercourse. My own subordinate position as an assistant of one of the departments (the engineer) up to 1835, inclusive, permits me only to answer this question in this general way.

5. To the fifth interrogatory on the behalf of the Complainant, he says: The railway branch of civil engineering was in its infancy in America when the Baltimore and Ohio Railroad was commenced. The experience of American engineers in that branch was consequently small. The only railroads of any extent, then in actual operation in this country, were the Quincy Railroad, for transporting granite from the quarries of that name in Massachusetts, the Mauch Chunk and Lackawanna Coal Railroads in Pennsylvania and New York.

The Baltimore and Ohio Railroad Company sent two of the members of its board of engineers to England, in 1828, to obtain information upon the subject of railroads.

6. To the sixth interrogatory on behalf of the Complainant, he says: The Baltimore and Ohio Railroad did not materially differ, in the manner of its construction, from the American railroads in operation at its commencement; but, as compared with those lines of general transportation in England and this country which followed it within a few years, it was more curved in its plan, and slighter in the construction of its track.

The reasons were, that, for the first fifty or sixty miles, the route lay in narrow and winding valleys; and the means of the company did not permit them at first to lay down a substantial railway.

7. To the seventh interrogatory on behalf of the Complainant, he says: The road, being more curved than others of its class, required that in the cars and engines their running gear should be planned with more reference to curvature in the roadway; and the machinery in use upon most of the other roads here referred to would have been unsuited to the Baltimore and Ohio Railroad. The modifications required in that machinery, so as to fit it for the Baltimore and Ohio Railroad, were such as to permit the axles of the wheels to arrange themselves as far as practicable in the radius of the curves; and, where that was impracticable, to be brought so close together as to deviate as little as possible from such radial position, and at the same time to support the car and engine bodies with the least disturbance from the effect of irregularities in the level of the roadway.

8. To the eighth interrogatory on behalf of the Complainant, he says: Experiments to ascertain the resistance from friction of cars of different models on straight lines and curves were made in the year 1830, as well as I can recollect, by Ross Winans and John Elgar, under the direction of Jonathan Knight, chief engineer. I did not witness the experiments, but heard John Elgar and Jonathan Knight speak of them; and I saw the mathematical analysis of their results by Jonathan Knight.

9. To the ninth interrogatory on behalf of the Complainant, he says: The first eight-wheel car placed upon the road was for the transportation of passengers. It was called the Columbus, and was built in the company's shops under the direction of Ross Winans, the Complainant, as I understood; but I have no personal knowledge of this, as I was frequently absent from Baltimore on duty upon the line, at the time of the construction of said car.

10. To the tenth interrogatory on behalf of the Complainant, he says: The said car was considered as a novelty by all whom I heard speak of it, embracing most of the officers of the company, and such of the citizens of Baltimore as talked of it in my hearing. I remember particularly that Mr. Knight said (somewhat playfully), on first mentioning it to me, that Mr. George Brown was much interested in the construction of a new car (referring to the Columbus), that was to carry a hundred people, — or in words, — conveying to my mind the impression that he (Mr. Knight) regarded it as a striking innovation upon previous ideas.

11. To the eleventh interrogatory on behalf of the Complainant, he says: The drawing marked "car Columbus," annexed to this Com-

mission, represents the car by that name above mentioned, as near as I can remember; and it was the first eight-wheel car I know any thing of, upon the Baltimore and Ohio Railroad, or any other railroad.

12. To the twelfth interrogatory on behalf of the Complainant, he says: There were other cars constructed like the car Columbus, in the number of their wheels; but their bodies were different, and also the manner of supporting them on the wheels and applying the draft to them, as well as I can recollect.

13. To the thirteenth interrogatory on behalf of the Complainant, he says: The Washington Branch Railroad was opened for use on the 25th of August, eighteen hundred and thirty-five.

14. To the fourteenth interrogatory on behalf of the Complainant, he says: I know that, after the car Columbus, there were three other eight-wheel cars built in the company's shops prior to the opening of the Washington Road, and to which the names of the Dromedary, the Winchester, and the Comet, were given. I don't now recollect the details of these cars, nor of the circumstances or direction under which they were constructed, nor do I know from personal knowledge who designed them. My impression was, and is, that they were planned mainly or entirely by Ross Winans, the Complainant, and were the results of his efforts to improve the application of the eight-wheel principle in the form, proportions, and arrangement of passenger-cars, for which kind of transportation they were used. They differed from each other in the position of the trucks under the body, and in other particulars of which I have no distinct recollection at this distant day.

15. To the fifteenth interrogatory on the part of the Complainant, he says: The drawing now shown to me, marked "car Dromedary," appears to represent the car to which it refers, to the best of my recollection. (See Appendix, Drawing D.)

16. To the sixteenth interrogatory on behalf of the Complainant, he says: That the drawing now shown to me, marked "car Comet," appears to represent the car to which it refers, to the best of my recollection. (See Appendix, Drawing C.)

17. To the seventeenth interrogatory on behalf of the Complainant, he says: The experiments referred to in this interrogatory were such as were required to determine, first, the best position of the wheels of each truck with respect to each other; and, secondly, the best position of the two trucks under the body of the car. The points to be considered under the first head were the friction of the wheels in the curves of the road, on the one hand, and the weight, size, and cost of the truck, which would be lessened by placing the wheels closer together; and the steadiness in the movement of the truck, on the other hand, which would be increased by placing the wheels farther apart. The points to be considered under the second head were the same in regard to the body of the car, as in respect to the trucks, viz. the size, form, weight, and cost of the body, its ease of draft and movement in curves, and its steadiness on all parts of the road. The mode of applying the draft to the car was also a point embraced in

the experiments. I am not able to say, from personal knowledge, who conducted these experiments. My information and belief was at the time, and still is, that they were conducted by Ross Winans, the Complainant.

18. To the eighteenth interrogatory on behalf of the Complainant, he says: I know several eight-wheel cars built for the Washington Branch Railroad, in the shops of the Baltimore and Ohio Railroad Company, in the years eighteen hundred and thirty-four and eighteen hundred and thirty-five; and I know that they were designed by, and constructed under the direction of, the Complainant, Ross Winans.

19. To the nineteenth interrogatory on behalf of the Complainant, he says: The cars referred to, in my preceding answer, as "Washington cars," were eight-wheel cars for passengers. I cannot so well describe them as by referring to the drawing hereto annexed and marked W. B., by which the proportions and positions of all the parts are clearly shown, as I remember them. They differed from the eight-wheel cars made prior to them, in the form and framing of the body and trucks,—in the manner in which the body was supported on the trucks. They do not differ in the principles of their construction from the eight-wheel cars now in use. (See Appendix, Drawing W. B.)

20. To the twentieth interrogatory on behalf of the Complainant, he says: Eight-wheel freight cars were first used on the Baltimore and Ohio Railroad, in eighteen hundred and thirty-five.

21. To the twenty-first interrogatory on behalf of the Complainant, he says: The person spoken of, and commonly known, as the inventor of the eight-wheel car used on the Baltimore and Ohio Railroad, was Ross Winans, the Complainant. I believe him to have been the inventor, because the invention was attributed to him by the officers and agents of the Baltimore and Ohio Railroad Company, with whom I had intercourse, and by the community of Baltimore, as far as I heard opinions expressed upon the subject. My conversations with Mr. Winans himself, from time to time, also impressed me with this belief; but my engagements away from Baltimore prevented me from visiting the company's shops, at that time, often enough to speak from personal knowledge of what was doing there between the time of my entering the service, in 1830 to 1835.

22. To the twenty-second interrogatory on behalf of the Complainant, he says: The advantages of the eight-wheel car are briefly summed up as follows: 1. More steadiness of movement upon the road, and, consequently, less wear and tear of car and road, and more comfort to passengers and less damage to freight; 2. More facility in turning the curves of the road; 3. More spaciousness in the apartment for passengers; 4. More safety in case of accidents from fractures of wheels or axles, or any other cause by which the car may be thrown from the track.

23. To the twenty-third interrogatory on behalf of the Complainant, he says: I know no fact which would be an answer to this interrogatory.

24. To the twenty-fourth interrogatory on behalf of the Complainant, he says: The specification referred to in this interrogatory is, in

my opinion, sufficiently descriptive of the principles claimed by the patentee, as his invention, to enable one skilled in the construction of railway cars to build a car embracing these principles, suitable for the transportation of freight and passengers, at the speed of twenty miles per hour.

25. To the twenty-fifth interrogatory on behalf of the Complainant, he says: The drawing referred to in this interrogatory, and attached to the Letters Patent, exhibits, in my opinion, a car possessing the advantages claimed by the text of the specification of said patent. The knowledge I have of the subject is derived from a connection of nearly twenty-four years with the construction and operation of railways.

26. To the twenty-sixth interrogatory on behalf of the Complainant, he says: The eight-wheel cars in general use conform, in the principles of their construction, to the description in said Letters Patent, although there are differences in the distances at which the wheels of each truck are placed from each other, and also in the distances from each other at which the trucks are placed, under the body of the carriage.

27. To the twenty-seventh interrogatory on behalf of the Complainant, he says: The novelty intended to be secured to the Complainant, by said Letters Patent, is the combination of proximity in the wheels of each of the trucks to themselves, and remoteness in the relative positions of the two trucks, under the body of the carriage.

28. To the twenty-eighth interrogatory on behalf of the Complainant, he says: The comparative length of body and distance apart of the axles of four-wheel cars, on railways, are regulated by, first, the consideration of steadiness of movement, which is increased by remoteness; and, secondly, the facility of turning curves, which is increased by proximity. A judicious balance must be struck between these opposite requirements.

29. To the twenty-ninth interrogatory on behalf of the Complainant, he says: There is such a position, and it is where the axles are as far apart as the frame of the body will allow.

30. To the thirtieth interrogatory on behalf of the Complainant, he says: I cannot answer this question, not knowing the facts or recollecting the details.

31. To the thirty-first interrogatory on behalf of the Complainant, he says: The minimum curve of the Baltimore and Ohio Railroad was three hundred and ninety-five feet radius, with a single exception, in which the radius was about three hundred feet, for a very short distance. The average weight, per lineal yard, of the plate-rail first laid was about fifteen pounds per yard, and it was supported by a six by six string-timber.

32. To the thirty-second interrogatory on behalf of the Complainant, he says: I cannot answer this question accurately. The weight of the plate-rails used was eleven pounds per yard and upwards; and of edge-rails, from twenty-six to thirty-six pounds per yard, or thereabouts.

33. To the thirty-third interrogatory on behalf of the Complain-

ant, he says: I did not know Conduce Gatch, or what were his duties or authority.

34. To the thirty-fourth interrogatory on behalf of the Complainant, he says: I refer to my answer to the preceding interrogatory.

35. To the thirty-fifth interrogatory on behalf of the Complainant, he says: I have examined the Letters Patent and drawings referred to in this interrogatory, and do not think they describe such a railroad-car as is described in the Letters Patent issued to the Complainant, October 1, 1834. The use of eight wheels in Chapman's patent appears to have for its object the diffusion of weight, and also the easier turning of curves; but the combination of nearness to each other, in the wheels of each carriage, and distance in the carriages from each other, is not contemplated in Chapman's patent; besides which, the latter is applied to a different sort of "carriage," to be used for a different purpose.

36. To the thirty-sixth interrogatory on behalf of the Complainant, he says: I have examined Tredgold's treatise, referred to in this interrogatory, and find therein a description and drawing of an eight-wheel car, which resembles that of the Complainant's patent, in the number of its wheels. It differs, however, first, in the manner of supporting the body on the trucks, which is done by resting it on the middle of their side-frames, with such freedom of motion at the points of support as to allow the wheels to follow the vertical inequalities of the road, but not the horizontal deviations due to the curves; second, in the principle embodied in the Complainant's patent, and heretofore mentioned, viz. proximity of the wheels of each truck to each other, and distance of the trucks apart from each other. The object of Tredgold's car appears to have been distribution of weight and accommodation to irregularities in level only.

37. To the thirty-seventh interrogatory on behalf of the Complainant, he says: I have examined Wood's treatise, referred to in this interrogatory, and find in it no notice of an eight-wheel car resembling that of the Complainant's. I find an eight-wheel engine, supported on the side-pieces of the two truck-frames, as the car suggested by Tredgold, referred to in the preceding interrogatory, and, like it, deficient in the freedom to accommodate itself to the curves of the track; the only object of using eight wheels in the engine described by Wood being, as in the car suggested by Tredgold, to distribute the weight equally, and to let the wheels follow the vertical unevenness of the track.

38. To the thirty-eighth interrogatory on behalf of the Complainant, he says: I have examined the specification of Ephraim Morris, referred to in this interrogatory, but find no resemblance in the car that it describes, for raising and lowering boats from one level to another on canals, to the Complainant's car, except that they both have eight wheels and the power of accommodating inequalities of level in the track.

39. To the thirty-ninth interrogatory on behalf of the Complainant, he says: I have examined the specification and drawing, annexed to the Letters Patent of Jonas P. Fairlamb, referred to in this interroga-

tory. An eight-wheel car is indicated therein, which resembles that of the Complainant's in having two trucks, and in its manner of supporting the body on the trucks by a pivot bearing over each, so as to permit the trucks to arrange themselves conformably to the curves of the road. The trucks, however, have in themselves a provision for accommodation to the curves, by allowing the axles to depart from parallelism, and, as the specification of Fairlamb expresses it, to vibrate by means of certain friction-rollers, plates, &c., &c. This provision in the trucks is the leading feature of the invention. The placing of two trucks under one long car-body appears to be an incidental suggestion, and the whole combination differs from that of Winans in that the latter assumes the axles of each truck to remain parallel, while it obviates the effect of this parallelism in curves, by putting them near together, at the same time putting the trucks far apart, for steadiness of movement. The vibrating movement of the axles of Fairlamb's truck would be unnecessary and unsafe, in my opinion.

40. To the fourteenth interrogatory on behalf of the Complainant, he says: The temporary connection of two four-wheel cars does not, in my opinion, combine the principal advantages of the eight-wheel car, for the purpose to which such temporary combination is applied. It suggests the eight-wheel car, but is not itself the eight-wheel car.

41. To the forty-first interrogatory on behalf of the Complainant, he says: The six-wheel locomotive referred to in this interrogatory exhibits one element of the eight-wheel car of the Complainant, but resembles it only so far as to lead suggestively to the conception and design of the latter.

42. To the forty-second interrogatory on behalf of the Complainant, he says: I do not know any other matter relating to the invention of the said eight-wheel car.

(For Cross-interrogatories, see p. 213.)

X 1. To the first cross-interrogatory, on the part of Defendants, he says: I answer to the fourth direct interrogatory from my personal knowledge of the subject-matter, as an officer of the company, in frequent communication with the other officers, and from the printed and published reports of the company.

X 2. To the second cross-interrogatory, he says: I have it not in my power to annex the reports referred to, in this cross-interrogatory; and I refer to my previous answer for the sources of my information upon the subject of this interrogatory.

X 3. To the third cross-interrogatory, he says: The reports of the Baltimore and Ohio Railroad Company were generally published in the American Railroad Journal, and occasionally those of a scientific character in the Journal of the Franklin Institute, during the years specified in this interrogatory; and they will be found in those periodicals, on reference to them. I was not the author of any of the reports referred to.

X 4. To the fourth cross-interrogatory, he says: There were distinct shops, for the different kinds of work, specified in this cross-interrogatory; but I cannot state, from personal knowledge, who were the "*bosses*" in each shop.

X 5. To the fifth cross-interrogatory, he says: I cannot say how many hands worked in the said shops; nor did I know any of them personally.

X 6. To the sixth cross-interrogatory, he says: I knew George Gillingham first in 1831. He was superintendent of machinery from 1832 to 1835, both years inclusive. He directed the construction and repairs of cars, and the repairs of engines. These were his duties, and none other, that I know of. He has been dead some years.

X 7. To the seventh cross-interrogatory, he says: Jonathan Knight was chief engineer of the Baltimore and Ohio Railroad.

X 8. To the eighth cross-interrogatory, he says: I know Ross Wigans. I have had no other means of knowing what he is worth than the public at large. He is reputed, and I believe correctly, to be wealthy; but I cannot say to what extent.

X 9. To the ninth cross-interrogatory, he says: The Baltimore and Ohio Railroad was commenced in 1828. Prior to that date, I had no personal acquaintance with any American engineers, as I did not enter the profession till 1830.

X 10. To the tenth cross-interrogatory, he says: My knowledge of the "other" railroads, than the Baltimore and Ohio Railroad, referred to in my answer to the fifth direct interrogatory, was derived first from the accounts of those roads, given to me by professional engineers and others; and afterwards, from the American Railroad Journal, and the American edition of "*Wood on Railroads*," edited by George W. Smith, and published in 1832. I can state no dimensions, or other details, from personal knowledge.

X 11. To the eleventh cross-interrogatory, he says: I saw no running gear upon any other road than the Baltimore and Ohio Railroad, until the year 1835, when I first passed over the Boston and Providence Railroad, and examined the four-wheel cars then used on that road.

X 12. To the twelfth cross-interrogatory, he says: In my answer to the ninth interrogatory, I consider as freight all articles of carriage, except passengers and their baggage, and the mails. The first eight-wheel car for carrying freight had no particular name to designate it, that I know of: it was used, I think, for carrying produce and merchandise; but of this, I have not a distinct recollection.

X 13. To the thirteenth cross-interrogatory, he says: In my answer to the ninth direct interrogatory, I mean to say, that the person there spoken of, as having directed the construction, had the direction of the particular work there referred to, and not a general supervision of the department in which the car referred to was built. My knowledge was derived from the report of others in the service of the company; but I cannot now name them.

X 14. To the fourteenth cross-interrogatory, he says: I cannot answer this question from any personal knowledge of the matter, but

only from the sources of information mentioned in my reply to the last cross-interrogatory.

X 15. To the fifteenth cross-interrogatory, he says: I cannot say whether there was any cord-wood transported under the circumstances described in this interrogatory.

X 16. To the sixteenth cross-interrogatory, he says: I am aware that long sticks of timber or string-pieces were transported over the road, during its construction, upon four-wheel cars, coupled together by such a stick of timber. The string-pieces referred to rested on a transverse beam or bolster, itself resting on a similar beam or bolster, pinned or bolted to the platform of the cars, over the space midway between the axles of the wheels; the upper bolster being so shaped and retained on the lower bolster, by a vertical pin or bolt, acting as a pivot, and which permitted the two cars to accommodate themselves to the curves of the road.

X 17. To the seventeenth cross-interrogatory, he says: I do not recollect the circumstance referred to by this interrogatory, although it may have been the fact that cord-wood was conveyed upon two four-wheel cars, coupled together like the timber cars, described in my answer to the preceding cross interrogatory, but with more than one coupling-timber, in order to support the wood.

X 18. To the eighteenth cross-interrogatory, he says: I first saw the Columbus at the Mount Clare Station, on the Baltimore and Ohio Railroad, while it was being built, in the year 1831.

X 18. To the (2) eighteenth cross-interrogatory, he says: I did not measure any part of the car Columbus.

X 19. To the nineteenth cross-interrogatory, he says: This interrogatory is answered by my reply to the last cross-interrogatory.

X 20. To the twentieth cross-interrogatory, he says: I am unable to answer this question, not recollecting whether said car Columbus was or was not altered.

X 21. To the twenty-first cross-interrogatory, he says: The answer to the last cross-interrogatory is a reply to this.

X 22. To the twenty-second cross-interrogatory, he says: In saying that I believe the drawing referred to in my answer to the eleventh direct interrogatory represented the car Columbus, I spoke in general terms, with reference to my recollection of said car, and its resemblance to the drawing. I cannot speak particularly of the truck exhibited in said drawing, or whether it was or was not originally constructed differently.

X 23. To the twenty-third cross-interrogatory, he says: I cannot answer any part of this interrogatory specifically. My recollections of the car, as already stated, are only of a general character.

X 24. To the twenty-fourth cross-interrogatory, he says: I refer to my last answer for a reply to this.

X 25. To the twenty-fifth cross-interrogatory, he says: I understand the part of the "ground-plan," in the drawing referred to in this interrogatory, to be a transom-plate or swivel-plate, on which the truck revolved in adjusting itself to the curves of the road.

X 26. To the twenty-sixth cross-interrogatory, he says: I am not

able to answer this question; my recollection of said railing not being sufficiently distinct.

X 27. To the twenty-seventh cross-interrogatory, he says: I cannot answer the twenty-third and twenty-fourth cross-interrogatories more specifically, in regard to the other cars referred to in my answer to the twelfth direct interrogatory, than I could in regard to the car Columbus; and for the same reason, that my recollections of those other cars are only general.

X 28. To the twenty-eighth cross-interrogatory, he says: My answer to the last cross-interrogatory will be also a reply to this one.

X 29. To the twenty-ninth cross-interrogatory, he says: My answer to the fourteenth direct interrogatory will obviate a particular answer to this. I made no such detailed knowledge of the subject-matter of the question as it imports, and no such documents or drawings as it describes.

X 30. To the thirtieth cross-interrogatory, he says: This question is answered by my reply to the twenty-ninth cross-interrogatory, as my knowledge and recollection of the cars Dromedary and Comet are not materially more distinct than of the car Columbus.

X 31. To the thirty-first cross-interrogatory, he says: I refer to my answer to the preceding cross-interrogatory.

X 32. To the thirty-second cross-interrogatory, he says: The proportions of the eight-wheel cars now in common and general use are variable, but do not materially differ from those of the Washington cars referred to in the direct interrogatories, and my answers thereto. The dimensions of eight-wheel cars, on different roads, however, differ materially. The class of eight-wheel cars may be said to be in universal use on American railways. I can give no names or numbers by which they can be designated. To the specific inquiries of this question, I answer as follows:—

1. The length of eight-wheel passenger-car bodies generally ranges from thirty-five to forty feet, between the end-platforms.
2. The diameter of the wheels from thirty to thirty-six inches.
3. The distance of the centres of the axles apart, in each truck, from thirty-six to fifty-six inches.
4. The distance of the centres of the trucks from each other range from twenty-eight to thirty-two feet apart.

The principles necessary to establish, after the Columbus was built, were those already set forth in my reply to the seventeenth direct interrogatory.

X 33. To the thirty-third cross-interrogatory, he says: My reply to this interrogatory will be found in that to the twenty-third cross-interrogatory.

X 33½. To the thirty-third and a half cross-interrogatory, he says: The car Columbus was used for public travel on the Baltimore and Ohio Railroad, for one or two years, and perhaps more; although I cannot recollect the time it was in use, nor by what officers of the company it was run or driven.

X 34. To the thirty-fourth cross-interrogatory, he says: I did not see the design of the Washington cars made, and cannot furnish it

as requested. I cannot say who did the work or built the trucks. The trucks differed from those of the eight-wheel cars previously built, in the mode in which they were framed, and in the arrangement of the springs. The bolsters were of wrought-iron, and also the transverse bars of the truck-frames; those of the preceding cars having been of wood.

X 35. To the thirty-fifth cross-interrogatory, he says: I do not recollect when I last saw the car Columbus. I think she first went into use early in eighteen hundred and thirty-one.

36. To the thirty-sixth cross-interrogatory, he says: I remember that a number of freight-cars, of the eight-wheel model, were built by contract with some one, whose name I have forgotten, in eighteen hundred and thirty-four, as well as I can recollect; and probably prior to the completion of the Washington cars.

X 37. To the thirty-seventh cross-interrogatory, he says: I do not recollect how these freight-cars were drawn, nor in what respects they differed from the Washington cars, as to the plan and arrangement of the trucks, excepting that the bolsters and transverse bars of the trucks were of wood, and not of iron.

X 38. To the thirty-eighth cross-interrogatory, he says: I cannot say in what respect said freight-cars differed from the Columbus as to their trucks.

X 39. To the thirty-ninth cross-interrogatory, he says: The gauge of the Baltimore and Ohio Railroad track in 1830 was four feet nine and a quarter inches.

X 40. To the fortieth cross-interrogatory, he says: I know nothing of the authority that Conduce Gatch had from George Gillingham, or any one else. I have stated what was the capacity in which George Gillingham served said company, in my answer to the sixth cross-interrogatory.

X 41. To the forty-first cross-interrogatory, he says: I cannot answer this question, as will appear from my reply to the preceding cross-interrogatory.

X 42. To the forty-second cross-interrogatory, he says: The car Columbus did not, I think, begin to run till 1831; and was followed, at intervals, by the Dromedary, Winchester, and Comet, all of them being used for public travel from their respective time of completion, and, I presume, with the knowledge and consent of Ross Winans.

X 43. To the forty-third cross-interrogatory, he says: I answer this question, in all its particulars, in the negative.

X 44. To the forty-fourth cross-interrogatory, he says: I do not know of any party interested in said patent but Ross Winans himself.

X 45. To the forty-fifth cross-interrogatory, he says: I believe it was.

X 46. To the forty-sixth cross-interrogatory, he says: The Washington cars were commenced in the summer of 1834, and finished in that of 1835.

X 46½. To the forty-six and a half cross-interrogatory, he says: The car Comet was not successful in her original form, according to the best of my recollection. She was, I think, subsequently altered, and afterwards ran for a considerable time, but has long since been broken up.

X 47. To the forty-seventh cross-interrogatory, he says: The flanges of the car-wheels did, I have understood, originally run outside of the rails, when travel first commenced on the Baltimore and Ohio Railroad in 1829; but were changed to the inside of the rails before I entered the company's service in the year 1830.

X 48. To the forty-eighth cross-interrogatory, he says: I have not seen any of the interrogatories, put to me on behalf of the Plaintiff, before this examination.

BENJ. H. LATROBE.

UNITED STATES CIRCUIT COURT, }
MASSACHUSETTS DISTRICT.— Oct. Term, 1852. }

ROSS WINANS vs. EASTERN RAILROAD COMPANY,

IN EQUITY.

Interrogatories to Philip E. Thomas, Evan Thomas, and George Brown, of Baltimore, in the State of Maryland, on behalf of the Complainant.

1. What is your age, name, residence, and occupation, present and past.

2. Whether or not you were at any time an officer of the Baltimore and Ohio Railroad Company? And, if yea, what office did you hold, and when did you begin and cease to hold the same?

3. Please state in what manner the business of the company was conducted; whether or not the duty of its agents and officers were specific or general; and generally the mode in which its affairs were transacted; and the organization of its corps of officers, who they were, and what their duties were.

4. What railroads were in operation in this country for passenger-travel, when the said Baltimore and Ohio Railroad was commenced, so far as your knowledge extends; and when was the said railroad commenced?

5. Who was the chief engineer of the said road; and who were his principal assistants in preparing the road and its machinery for business prior to the year 1835?

6. Do you know Ross Winans, the Complainant? If yea, how long have you known him? When, if at any time, did he enter the service of the said company? What was the nature of his relations with the said company; and what were his duties upon their road?

7. Whether or not the plan of construction and form of cars to be used on the said railroad were regarded as subjects of importance, or otherwise, by the officers of said company? And, if they were subjects of consideration and discussion among them, please state to what extent and upon what grounds such discussion was carried on.

[Objected to as hearsay and as irrelevant.]

8. What knowledge have you respecting the first eight-wheeled car placed upon said railroad? Please to state fully all you know concerning it and its novelty; particularly where and when you first had knowledge of it; who furnished the plans or drawings by which it was constructed; where it was built; at whose expense; and who superintended and explained its construction to the workmen employed upon it; and also by what name it was designated?

9. If you say that the said car was called the "Columbus," please state whether or not any other cars were constructed for use on the said railroad upon the same plan and proportion? And, if yea, how many? If not, for what reasons?

10. Whether or not you saw, at or about the time when said car was constructed, the drawing or plan by which it was built? And, if yea, when did you last see the same? Please examine the paper annexed marked "Columbus," and state if the same is a copy of the said drawing. If not, wherein does it differ?

11. Whether or not were any experiments made with other plans of eight-wheeled cars upon the said railroad, prior to the opening of the Washington branch thereof? If yea, from whose plans were the said cars constructed; and who superintended their construction? Wherein did they differ from each other? Examine the drawings annexed.

12. Whom do you believe to have been the inventor of the eight-wheeled railroad cars in general use in this country. If you express an opinion, please give the reasons for your belief and the grounds of your opinion.

[Objected to, as inquiring into belief and opinion.]

13. [*De bene esse.*] Did you know Conduce Gatch, in the employ of said company? If yea, what was his position and duty? And please state whether or not he had at any time authority to order cars to be constructed at the company's expense, of other kinds, or upon other plans, than such as had been approved and prepared by the engineers of the said company, for use on the said road? If yea, during what period and to what extent did he possess such authority?

14. [*De bene esse.*] Whether or not had the said Gatch authority, while in the employ of the said company, to construct or to order the construction of any kind of cars at the company's expense, without directions so to do from his superiors in the service of said company? If yea, when did he possess such authority?

15. If you know any thing further relating to the said eight-wheeled cars of advantage to the said Winans in maintaining his suit against the Eastern Railroad Company not inquired of, please state all you know as to the invention thereof fully.

C. P. CURTIS, JR., *Solicitor for Complainant.*

UNITED STATES CIRCUIT COURT, }
 DISTRICT OF MASSACHUSETTS. — October Term, 1852. }

Cross-interrogatories to Philip E. Thomas, Evan Thomas, and George Brown.

X 1. Who was the superintendent of the said railroad prior to 1835?

X 2. If you answer the eighth interrogatory, will you designate the car you refer to in your answer thereto by name?

If you have mentioned in said answer any plans or drawings as having been furnished, will you produce the same, that is, the originals thereof?

Did you see any person hand over the said plans or drawings to any other person; and when and where did you examine or see said plans or drawings before they were so handed over?

Did you see said plans or drawings when they were being made, and who was making them?

X 3. Can you swear that no additions were made to the drawing of the Columbus after the car Columbus was built? and who made those additions to said drawing?

X 4. If, in answer to the eighth interrogatory, you say that explanations were made to the workmen employed upon the car referred to, state whether the explanations were given in your presence and hearing, and whether verbal or written, and what were they. Give the language; to whom were they given; name the workmen; and, if given in writing, also annex the original to your answer. Also name all the workmen who you recollect were employed upon it, and state the kind of work done by each, and the particular instructions or explanations given to each man; and the state of the work, and in relation to which each explanation or instruction was given.

Have you, in your preceding answer, given or stated every explanation or instruction which you have intended to cover in your answer to the eighth direct interrogatory. If not, please do so.

X 5. Can you state positively that you saw the original drawing mentioned in your answer to the tenth interrogatory before the car Columbus was commenced? or that you saw it before the said car was put upon the road?

Can you undertake to say that the said drawing has not been added to, since the Columbus first went upon the road?

X 6. If you refer to any original drawing of said car Columbus, in whose possession was it at the time you saw it? Was it painted; and of what color? Will you produce the same, and annex it to your answer?

X 7. Were all the improvements made by Ross Winans (if any were made) on the Baltimore and Ohio Railroad usually noticed in the newspapers at the time. If yea, in what newspapers, and where were they printed?

X 8. Are you not aware that the drawing of the railing and the trucks was added to the original drawing of the car Columbus, after the car

was first put to running on the road; and are you not aware that the railing itself was designed and put upon the car some weeks after the car was first put upon the road?

X 9. Are either of you in the habit of doing business with Ross Winans? If so, what kind of business? Is either of you his banker?

WILLIAM WHITING, *Solicitor of Respondents.*

X 10. Will you state whether the car Columbus was used on the Baltimore and Ohio Railroad publicly or for public travel, after July 4th, 1831? If so, for how long time?

X 11. Whether such use was with the knowledge of said Ross Winans, and with his consent and allowance?

X 12. Whether said Winans was paid an annual or other salary by said company or any company; and, if so, what company; what was that salary, and what was it paid for?

X 13. At whose expense and for whose benefit, profit, or advantage was the said car Columbus run, if run at all?

X 14. On which side of the rails that were first laid upon the said Baltimore and Ohio Railroad did the flanges of the wheels run? outside or inside thereof? and when was the alteration so made that the flanges should run on the inside?

X 15. Has the original, or copies of any of the Plaintiff's direct interrogatories or the substance thereof, been shown, or read, or stated to you before this examination? If so, when, and by whom?

WILLIAM WHITING, *Defendant's Solicitor.*

A true copy attest,

H. W. FULLER, *Clerk.*

GEORGE BROWN, being produced this seventh day of March, A. D. 1854, as a witness on behalf of the Plaintiff in this cause, and being carefully cautioned and sworn to tell the whole truth, and nothing but the truth, deposeth in answer to the interrogatories exhibited to him on behalf of said Plaintiff, as follows:—

(*For Interrogatories, see p. 259.*)

1. To the first interrogatory. I am sixty-seven years old; have resided in Baltimore City and Baltimore County, and conduct a banking and other general business.

2. To the second interrogatory. From the commencement of the Baltimore and Ohio Railroad Company in eighteen hundred and twenty-seven, to eighteen hundred and thirty-four, I was treasurer of the company, without compensation. Since that period, I have been nearly the whole time a director of the company.

3. To the third interrogatory. The company had different agents or officers to attend to the several departments, and it was left almost altogether to the President to regulate the duties of said agents.

4. To the fourth interrogatory. I knew of no railroads in this country at the commencement of the Baltimore and Ohio Railroad Company, except the Mauch Chunk and the Quincy, and I do not know whether they took passengers, but think they did not. The Baltimore and Ohio Railroad was commenced on the fourth of July, in the year eighteen hundred and twenty-eight.

5. To the fifth interrogatory. Jonathan Knight was the chief engineer of the road; his principal assistants were Col. Long, General McNeill, Lieut. Whistler, and other subordinates.

6. To the sixth interrogatory. I have known Ross Winans, the Plaintiff, since about the year eighteen hundred and twenty-eight. He entered the service of the company about June, eighteen hundred and thirty. The company, believing him to be useful to them in perfecting the machinery of the road, employed him to superintend the machinery department.

7. To the seventh interrogatory. The form of cars was considered by the company to be of vital importance to the success of the road, and it was frequently and extensively discussed on the grounds that any improvements that could be made were desirable.

8. To the eighth interrogatory. I believe the first eight-wheel car built was the Columbus, which was placed, I think, on the road about eighteen hundred and thirty-one, as an experiment. I applied to the Board of Directors to get leave to have it built at the company's shops; and, after the car was put on the road and tried, I do not think any other eight-wheeled cars were built for passengers, constructed like the Columbus without such improvements as Mr. Winans suggested.

The first suggestion in relation to an eight-wheel car, of which I have any recollection, occurred in a conversation between Ross Winans and myself, some space of time before the car Columbus was constructed.

I asked him whether eight-wheel cars would not be safer than four-wheel cars, and thus, as I suppose, first called his attention to the subject; but I did nothing more than this, and made no plan or design for such a car.

Soon afterwards, Ross Winans showed me a drawing of an eight-wheel car, and I was instrumental in obtaining the consent of the Board that an experimental car should be built therefrom. I took great interest in the progress of the road, and in the success of this eight-wheel car, and frequently saw and examined said experimental car (the Columbus) during its construction and afterwards.

9. To the ninth interrogatory. This is answered in the preceding eighth interrogatory, as far as I am able to answer it.

10. To the tenth interrogatory. I saw the plan of the car Columbus before and at the time it was being built, and also afterwards; and the drawing now shown to me, marked "Columbus," and annexed, is a copy of it, to the best of my belief. I do not know that it differs in any particular from the original. I do not remember when I last saw the original.

11. To the eleventh interrogatory. I am not aware that there were any other experiments made with eight-wheel cars on the road, except

such as Ross Winans, the Plaintiff, superintended or gave the drawings for.

12. To the twelfth interrogatory. I have no doubt that Ross Winans is entitled to the credit of having invented the eight-wheel railroad-car in general use in this country; and my reason for saying so is, that he was in the habit of talking freely with me, and showing me his plans, and I think I signed the specifications to be lodged at the Patent Office. I also refer to my answer to the eighth interrogatory for a further reply to this interrogatory.

13. To the thirteenth interrogatory. I know Conduce Gatch: he was the foreman in the company's shops where the Columbus was built from a drawing made by the Plaintiff, Ross Winans; and which drawing was, I think, handed to said Gatch by me. I do not think that said Conduce Gatch had any authority to build cars without the direction of the President: what directions he may have received from him I do not know.

14. To the fourteenth interrogatory. I refer, for answer to this, to my answer to the thirteenth interrogatory.

15. To the fifteenth interrogatory. I know nothing further relating to the eight-wheel cars, of advantage to the said Winans.

To the cross-interrogatories exhibited to him on the part of Defendants, he deposes as follows:—

(For Cross-interrogatories, see p. 261.)

X 1. To the first cross-interrogatory. Casper W. Weaver was the superintendent of the grading and masonry of the road, under the direction of the engineers and the President. (I suppose he is the officer alluded to in this interrogatory.)

X 2. To the second cross-interrogatory. The car I refer to in my answer to the eighth direct interrogatory was the car Columbus.

I cannot produce the originals, because I did not retain them, nor did I retain any copies of the drawings of the car Columbus. I saw the originals at different times. I think I saw them first at the Mechanics' Bank. I did not see them while being made, but saw them afterwards. After they were completed, the Plaintiff, Ross Winans, handed them to me; and I then examined them, as well as subsequently.

I do not remember to whom I handed the drawings after first examining them, but believe that, when the experimental car was ordered by the Board to be built, I handed the drawings to Mr. Conduce Gatch, as I have already stated.

X 3. To the third cross-interrogatory. I do not know of any additions being made to the drawings of the car Columbus after she was built; but I cannot swear positively that additions were not made.

X 4. To the fourth cross-interrogatory. With the exception of Conduce Gatch, I do not now recollect who were employed building the car or in the shop; and I have no doubt but that I conversed with

Mr. Gatch on the subject, but cannot now remember the language. I know of no written instructions given to the workmen, except the drawing given to Conduce Gatch, as I have already stated. I am not able to answer this interrogatory more fully, after so long an interval of time.

X 5. To the fifth cross-interrogatory. I saw the drawing before the car Columbus was built, therefore before it was put on the road; but cannot say positively that no additions have been made since the car Columbus went on the road. If so made, they are unknown to me.

X 6. To the sixth cross-interrogatory. I saw the drawing in possession of Ross Winans, the Plaintiff; and also had it in my own possession. I think it was yellow, but cannot say with any certainty. I cannot produce it, not having it in my possession.

X 7. To the seventh cross-interrogatory. I cannot recollect whether or not the improvements made by Ross Winans on the Baltimore and Ohio Railroad were usually mentioned in the newspapers at the time, but think it is likely.

X 8. To the eighth cross-interrogatory. I am not aware that the drawings of either the railing or the trucks were added to the original drawing of the Columbus after it was put on the road, nor am I aware that the railing was designed and put on the car after it was put on the road.

X 9. To the ninth cross-interrogatory. Ross Winans has kept his account with "Alex. Brown and Sons" (of which I am a member) for the last twelve years or so.

X 10. To the tenth cross-interrogatory. The car Columbus was used for general travel on the Baltimore and Ohio Railroad; but I do not know the length of time during which it was used, nor when the use commenced, except that it was so used soon after its completion.

X 11. To the eleventh cross-interrogatory. I have no doubt but that the car Columbus was used with Ross Winans' consent, it being the property of the company.

X 12. To the twelfth cross-interrogatory. Ross Winans was employed by the Baltimore and Ohio Railroad Company at about one thousand dollars a year as Engineer of machinery; and my understanding of the arrangement between him and the company was, that any improvement made and patented by him would be for his own account; but this, I believe, was never put in writing.

X 13. To the thirteenth cross-interrogatory. The car Columbus belonged to the Baltimore and Ohio Railroad Company, and was run for its benefit.

X 14. To the fourteenth cross-interrogatory. I do not recollect whether the flanges were ever on the outside; but the car Columbus was built with them inside.

X 15. To the fifteenth cross-interrogatory. They have not.

G. BROWN.

PHILIP E. THOMAS, being produced this eighth day of March, A. D. 1854, as a witness on the behalf of the Plaintiff in this cause, and being carefully cautioned and affirmed to tell the whole truth and nothing but the truth, deposeth in answer to the interrogatories exhibited to him, on behalf of said Plaintiff, as follows:—

(*For Interrogatories, see p. 259.*)

1. To the first interrogatory. I am in my seventy-eighth year. I reside in Baltimore, have retired from business, and have no occupation.

2. To the second interrogatory. I was the President of the Baltimore and Ohio Railroad Company from its organization until 1836, when I resigned, and retired from the management of the company.

3. To the third interrogatory. The business of the said company was governed by rules and placed under the superintendence of officers, whose duties were special, and who made reports at stated times, and when occasion required. The annual reports of the President and directors, which were printed for the information of the stockholders, contained generally such abstracts of the reports of the officers as was deemed proper to publish, if the reports were not printed entire. At this date I would find it difficult to state in detail the organization of the company, and would have to obtain my information from the annual reports above referred to, as I am not willing to trust to my memory. The reports that were made and printed, while I was President of said company, were intended to be, and I believe they were in point of fact, reliable.

4. To the fourth interrogatory. There was not any railroad in use for passenger-travel or general business in this country, until after the said Baltimore and Ohio Railroad was opened for use to Ellicott's Mills, in May, 1830. The Mauch Chunk and Quincy Railroads were in operation previous to May, 1830; but they were used and intended only for local purposes.

5. To the fifth interrogatory. The first engineers in the service of said company were officers of the United States Army. Col. S. H. Long and Captain W. G. McNeill were the principals, and others were employed under them. In the year 1830, the army-officers left the service of the company, and Jonathan Knight was made chief engineer: Casper W. Weaver was superintendent of construction. Mr. Knight had various persons as his assistants for the surveys, whom I do not now recollect.

John Elgar and Ross Winans were employed in the machinery department. I recollect them the more particularly, because John Elgar had been my personal acquaintance previously, and Ross Winans was then much spoken of in connection with his friction-wheel, which attracted great attention in Baltimore, but which fell into disuse, when the subsequent employment of steam at high velocities made it inexpedient to employ it.

6. To the sixth interrogatory. I know Ross Winans, the Com-

plainant, and have known him since soon after the said road was commenced. He entered the service of the company on the first of June, in the year 1830; a date which I fix by reference to a receipt of said Winans for his salary, which I saw marked "Approved by the Board, April 4th, 1831," in my own handwriting, and which refreshes my memory as to the date. The duties of said Winans were to improve and perfect the machinery intended for use on said railroad.

7. To the seventh interrogatory. The construction and shape of cars and carriages was regarded as a highly important subject, to which the attention of the engineers of the company was particularly directed; and, owing to the want of information, and the novel features of the road, and business to be done upon it, experiments were made, from time to time, for the purpose of determining the best construction of cars for use on said railroad.

8. To the eighth interrogatory. The first eight-wheeled car was a passenger-car, called the "Columbus," as I now recollect and believe. It was put upon said road during the time the said Ross Winans was in the service of said company, and under his supervision as deponent believes. In the early part of the year 1831, I think the said Ross Winans produced a drawing of a car for passenger-transportation, consisting of a body longer than the car-body then in use, and mounted upon eight wheels. Upon this plan a car was afterwards built, at the expense of the company, at their shops, and under his (Winans') superintendence. It was called the "Columbus," and used on the said railroad between Baltimore and Ellicott's Mills. I have frequently ridden in it. As far as I know, there had been no eight-wheel cars used at that time; that, at the time of the construction of the Columbus, Winans, the said Complainant, was regarded and spoken of as the inventor thereof. Nor do I remember to have heard the invention attributed to any other person. On a former occasion, when I was examined relative to the occurrences here referred to, I did not clearly recollect that it was the Columbus that was first used on said railroad; but, having refreshed my memory by an examination of the original drawing of the said carriage or car Columbus, and reflected upon the subject, I do now believe that the said passenger-carriage Columbus was the first car having eight wheels placed on said railroad; and that the said car subsequently underwent alterations, though in what particulars I do not now recollect.

9. To the ninth interrogatory. The Columbus being deemed capable of improvement, other eight-wheel cars were built by the said company, each of which, as I believe, varied from the others; the result of them all being shown in the Washington Branch Road cars, which were built on the plans and proportions recommended by Ross Winans, the Complainant.

10. To the tenth interrogatory. I did see a drawing of the said car, about the time it was commenced. I saw it again in the autumn of 1852. The paper annexed resembles the said drawing. I do not recollect any difference.

11. To the eleventh interrogatory. As already stated, there were other eight-wheel cars built prior to the opening of the Washington

Branch Road. They were called the "Winchester," "Dromedary," and "Comet." The drawings annexed resemble the cars so called.

12. To the twelfth interrogatory. I believe Ross Winans, the Complainant, to be the inventor of the eight-wheeled cars now in general use. It is an historical fact, that cars of this kind were first used in this country on the Baltimore and Ohio Railroad; that the first car so used was the Columbus, followed by the Winchester, the Dromedary, and the Comet experimental cars, which resulted in the "Washington" Branch cars, of the kind now in use, all of which, I believe, were the invention of Ross Winans, the Complainant. It was a part of his duty, in the service of the said company, to adapt the cars to the said road. I have a very distinct impression, that, from the origin of the Columbus till the cars for the Washington Branch Road were perfected, in the autumn of 1834, when it fell in my way, as President, to have intercourse with him, one of the principal subjects of his inquiries and conversation was the construction of cars best adapted to said road. George Brown, treasurer of the company, who had a great deal to do with the cars placed on the road, at an early day spoke of the cars as his (Ross Winans') invention. The subject was often discussed before me, and I never heard it attributed to any other person.

It would be impossible for me now to detail all the circumstances which have produced in my mind this conviction. And I sum up all by stating, that, during the time I was President of the company, from its organization to 1836, I took a leading part in its affairs, and believed myself well conversant with them.

I have no doubt that the complainant (Ross Winans) was and is the inventor of the eight-wheel car in general use, which first appeared in the Columbus, and, after sundry modifications, was perfected in the Washington Branch car.

Having refreshed my memory by reference to the reports made by myself, as President of the company, in the years 1834-35, I now testify to the truth of the statement contained in the following extract from them, the language of which I adopt as a concise form of expression:—

"After the experience of several years, the Board have come to the determination of employing an eight-wheel car, invented by Ross Winans, for the transportation of passengers. This consists of two ordinary running gear, with steel springs, each set having what may be called a rose-bolt equidistant from the centre of each wheel. The two sets are placed at the desired distance apart, and connected by a frame, stiffened by a thin iron plate, on the sides, on which frame the body of the car rests. The great advantage of this mode of construction consists in the steadiness of the car when moving on a curved road, or on one whose surface is uneven or slightly out of repair; for the two sets of wheels accommodate themselves to the inequalities of the surface without affecting the car, resting, as it does, on the centre of each set, and the important object which is attained is safety; for while, in the ordinary four-wheeled cars, the breaking of a wheel or an axle might be productive of the most

“fatal consequences, such could not be the case where, with eight wheels, there would be enough left to support it on the track until the train could be stopped. Again: upon a curved road it is necessary to place the pairs of wheels of a four-wheeled car as near as possible, so as to diminish friction; and this makes it necessary to build the body of the car very short, to prevent a disagreeable, and at times dangerous, vibration from side to side, while the car is in rapid motion. In the eight-wheel cars, on the contrary, the pairs of wheels of each set are placed as near together as can be desirable under any circumstances, and the sets themselves may be as far apart as may be necessary to accommodate a car of any length without increasing the friction on the rails when passing curves of the least radius, or producing the lateral motion complained of. In point of economy, too, this mode of construction is much preferable to the one hitherto employed.

“The eight-wheel passenger-car, mentioned in the last annual report, have been fully tested, both on the Washington Branch and the main stem, and are found to combine safety, convenience, ease of motion, and economy. They are considered far preferable to the common four-wheel cars in all these particulars, and have been permanently adopted by the Board. The same plan has been applied to burden-cars, with equally favorable results.”

13. To the thirteenth interrogatory. I recollect Conduce Gatch. He was by trade a millwright. He was employed by the company as a wood-worker. His duty was to select and obtain materials for use in the woodwork-shops, to attend to the workmen employed in them, and to the work directed to be done there by the engineers and officers of the company. The plan of construction of cars of new kinds, or of new proportions, was controlled by the engineers of the company, whose attention had been directed to that subject.

14. To the fourteenth interrogatory. As I have already stated, the duty of the said Gatch was to do the work directed to be done.

It was confined to the work of the shops, and the men employed in them. He had no authority to direct the plan of construction of any kind of cars at the company's expense, or to modify their plan of construction. He was never expected to do more than to attend to his men,—to provide materials for them to work with in executing the orders of the engineers and officers of the company.

15. To the fifteenth interrogatory. I know nothing further.

To the cross-interrogatories exhibited to him on the part of Defendant, he deposeth as follows:—

(For Cross-interrogatories, see p. 261.)

X 1. To the first cross-interrogatory. There was no general superintendent, except the President. The duties of the road were distributed among Bureaux; as, the Bureau of Construction of Machinery, of Transportation, of Masonry, &c., &c., which had their respective

superintendents. Of each of these Bureaux the President had the general superintendence.

X 2. To the second cross-interrogatory. I refer, in my answer to the eighth direct interrogatory, to the car Columbus.

I have no original drawings. I do not recollect of seeing any drawings made, or handed to any person by another. I saw the drawing of the Columbus about the time the said car was commenced, but under what particular circumstances I do not at this time recollect.

X 3. To the third cross-interrogatory. A drawing of an eight-wheel car was exhibited as the plan of a car devised by the Complainant. From this plan a car was authorized to be built. This was before the car was commenced. I do not know of any alterations in the drawing.

X 4. To the fourth cross-interrogatory. I cannot, at this time, state such particulars. I know that the car was ordered to be built, and I always understood that it was planned by Ross Winans, the Complainant. There were not any explanations or instructions given to workmen in my presence, nor do I know who worked upon the car. It was built at the shops of the company, in the department which was under the superintendence of the engineers of the company.

X 5. To the fifth cross-interrogatory. A drawing of an eight-wheel car was exhibited as the plan of the Complainant, and a car authorized to be built from it. This was before the car was commenced. I cannot state as to alterations: I did not observe any in it when I last saw it in October, eighteen hundred and fifty-two.

X 6. To the sixth cross-interrogatory. My recollection is confined to having seen a drawing, in whose possession I cannot now state, which represented the car that was afterwards built, called the Columbus, as already stated; whether it was painted or not, I do not now remember. It is not in my possession to produce.

X 7. To the seventh interrogatory. I cannot state as to this. A general interest was felt in the operations of the railroad, and notices of what had been done often appeared in the city newspapers; but whether every thing was so noticed with comments, I cannot say.

X 8. To the eighth cross-interrogatory. The drawing I have referred to, as having been shown before the car Columbus was built, exhibited a car with body and running gear; but whether the car, when built, was accurately like the drawing, I cannot state.

X 9. To the ninth cross-interrogatory. I have not any business-relations with the said Complainant, nor have I ever had any.

X 10. To the tenth cross-interrogatory. The car Columbus was used publicly on said railroad; but for what length of time I cannot say.

X 11. To the eleventh cross-interrogatory. It was used by the company as their property without objection by him to my knowledge.

X 12. To the twelfth cross-interrogatory. The said Ross Winans, the Complainant, was paid an annual salary by the Baltimore and Ohio Railroad Company, for his services as engineer of machinery. I cannot state as to others.

X 13. To the thirteenth cross-interrogatory. The car Columbus was run at the expense of the said Baltimore and Ohio Railroad Company, and for their profit.

X 14. To the fourteenth cross-interrogatory. The flanges of the wheels were on the outside of the rails that were first laid, as witness believes. This was for a very short distance, however, not exceeding a mile, and was soon changed to the present plan.

X 15. To the fifteenth cross-interrogatory. I have not seen, or heard read, any of the interrogatories before the examination. I was informed that my examination would have reference to the eight-wheel car, about which I had been already more than once examined; and inasmuch as on the last occasion, in October, 1852, I had taken much pains to be accurate, even to writing out my whole testimony with my own hand, I referred to a copy of my examination, and took it with me when I went before the Commissioner, and quoted from it myself, whenever I could, that I might save myself the trouble of a renewed examination of matters which I had already so carefully investigated into. I state this to explain the fact, should it be remarked, that portions of my statements on the two occasions are in the same language.

P. E. THOMAS.

I, JOHN HANAN, Commissioner named in the annexed Commission, do hereby certify, that, in pursuance thereof, I did, on the days herein before set forth, take the respective examinations of John Elgar, George Brown, Philip E. Thomas, Edward Ferry, and Benjamin H. Latrobe, some of the witnesses named in the Commission, in answer to the interrogatories and cross-interrogatories annexed, to be propounded to them respectively. And I do further certify that each of the said persons were by me first carefully examined, and cautioned, and duly sworn, according to law; that they were respectively examined by me separate and apart from all other persons, and from each other, and the interrogatories and cross-interrogatories were propounded to them in their order; and their respective examinations, as hereinbefore set forth, were reduced to writing by me, and thereafter subscribed by the said witnesses respectively in my presence. I do also certify that I am not of Counsel or Attorney for either of the parties to the said cause, and that I am not interested in the event of said suit.

Given under my hand and seal, at the city of Baltimore, within the District of Maryland, this third day of April, A. D. 1854.

JOHN HANAN, *Commissioner*. [SEAL.]

UNITED STATES CIRCUIT COURT,
DISTRICT OF MASSACHUSETTS. — October Term, 1852. }

ROSS WINANS *vs.* EASTERN RAILROAD COMPANY,

IN EQUITY.

DEPOSITIONS of witnesses produced, sworn, and examined the thirtieth day of June, eighteen hundred and fifty-three (and on the days hereinafter mentioned), at the city of Baltimore, in the State of Maryland, under and by virtue of the Commission hereto annexed, issued out of the Circuit Court of the United States, within and for the Massachusetts District, in a certain cause now pending in said court, wherein Ross Winans is Plaintiff, in equity, and the Eastern Railroad Company, Defendants, as follows: —

Interrogatories to be addressed to William Woodville, of Baltimore, on behalf of the Complainant.

1. What is your name, age, residence, and occupation? How long have you been so engaged, and where?
2. Whether or not you were at any time, and when, in the employ of the Baltimore and Ohio Railroad Company? If yea, in what capacity; and how long did you continue in said situation?
3. Are you acquainted with the Complainant, Ross Winans? If yea, when and where did you first become acquainted with him? When, if at any time, did he enter the service of the said company, and what were his duties in their service?
4. Who then had charge of the transportation-department of the said company; and what extent or means of knowledge had the master of transportation of said company, relative to the number, kind, and description of cars used for transportation of either passengers or freight on the said railroad?
5. If examinations were ever made as to the number, kind, and condition of the cars used on said road, by whom, and how often, and under whose direction, was it done; and to whom were the returns made thereof?
6. Whose duty was it to direct the construction of new or additional cars for use on the said road? Was said authority vested in more than one? And, if yea, in whom?
7. Please state, if you can, when the Washington branch of the said road was first opened for travel.
8. How many wheels had each of the cars which were used on the said Baltimore and Ohio Road at the commencement of business upon it; and when did said road open?
9. When, and for what purpose or kind of transportation, was the first eight-wheel car placed on said road? By what name was it designated when spoken of; and whether, or not, it was a novelty, or otherwise?
10. When were eight-wheel freight-cars first used on said road?

11. Whether or not were you accustomed to visit the work-shops of the said company during the years 1830, 1831, 1832, 1833, and 1834; and, if yea, how often, and where were they situated?

12. Under whose supervision and direction were the first eight-wheel cars constructed which were used on said road?

13. Who first invented the eight-wheel cars used on the said road; and whom do you believe to be the inventor of the eight-wheel railroad cars used on the railroads of this country? Please state your reasons for your belief, and the means and opportunities of knowledge you had for forming an opinion.

[Objected to, because he is asked to decide: 1. The issue between the parties; 2. A matter of opinion; 3. Irrelevancy; 4. Matter of belief; 5. That witness is not an expert.]

14. [*De bene esse.*] What was the position and duty of Conduce Gatch in the employ of said company during the time of your connection with it? and please state whether or not said Gatch had sufficient authority to direct the construction of a new kind of car, or an additional car, unless orders were first given him for it, and upon plans approved by the engineer of the said road; and, if yea, when was such power given him.

15. If you know any other matter or thing relating to the invention of the eight-wheeled car which will be of advantage to the Complainant in maintaining his suit against the Defendants, please state the same fully.

C. P. CURTIS, JR., *Solicitor for Complainant.*

CIRCUIT COURT OF THE UNITED STATES, }
DISTRICT OF MASSACHUSETTS. — October Term, 1852. }

ROSS WINANS vs. EASTERN RAILROAD.

Cross-interrogatories proposed on the part of the Defendant to William Woodville.

X 1. Are you an engineer; or did you ever build an eight-wheel car?

X 2. If, in answer to the sixth interrogatory, you say that Ross Winans alone had authority to direct the construction of new or additional cars on said road, will you state how you know, of your own knowledge, that no one else had any authority so to do? How was said or any authority given to said Winans or to others, in writing, or print, or verbally? If in writing or print, annex the same, or a true copy thereof; and, if verbally, state the language, and who spoke it, and to whom it was addressed, and state whether you know, of your own personal knowledge, that no other persons had authority to make,

or improve, or change, or build cars, excepting those whom you have mentioned in your answer.

X 3. If you say, in answer to the eleventh interrogatory, that you were accustomed to visit the work-shops as there inquired of in 1830, 1831, 1832, 1833, and 1834, will you state the names of all the workmen you saw; and what they were respectively at work upon so far as you can remember?

X 4. What *are the names* of the cars referred to by you in your answer to the twelfth interrogatory? How were they usually designated; and have you mentioned all that you included in your said answer?

X 5. Can you state one or more *directions* given by Ross Winans, in relation to the eight-wheel cars, prior to October 1st, 1834; *given in your personal presence*? If so, state the terms in which that direction was given, whom it was addressed to, when and where it was spoken, who was present. If more than one, will you please to state all the directions, and answer concerning each direction the same inquiries as are put relating to the first; and what car or cars the specific directions, if any, applied to; and whether said directions, if any, related to said Winans' friction-wheels?

X 6. [*De bene esse.*] If you answer the thirteenth interrogatory, will you please to state the names of the eight-wheel cars referred to by you?

X 7. Have you ever had, or have you now, any business-transactions with said Winans? If so, please state the nature of the business?

X 8. Are you aware that eight-wheel timber-cars, for carrying long string-pieces, and also eight-wheel cars, for carrying cord-wood, were used on the Baltimore and Ohio Road before the car Columbus was designed or commenced?

X 9. Are you aware that the railing on top of the car Columbus was designed and put upon her, several weeks after she was first run upon the road?

X 10. Have you any interest, direct or indirect, in the success of said Winans' said patent? Have you seen or heard any of the Plaintiff's direct interrogatories, before this examination? If so, when, where, and by whom, were they exhibited or stated to you?

WILLIAM WHITING, *Solicitor of Respondent.*

A true Copy. Attest,

H. W. FULLER, *Clerk.*

Deposition of William Woodville.

WILLIAM WOODVILLE, one of the witnesses named in said Commission, being duly sworn and carefully examined on the interrogatories and cross-interrogatories addressed and propounded to him, and annexed to said Commission, and being examined on behalf of the Complainant in the said cause, deposes and says as follows:—

1. To the first interrogatory on behalf of the Complainant, he says: My name is William Woodville; I am sixty-one years of age; reside in the city of Baltimore; and am a stockbroker. I have been engaged in said business for about seventeen years and upwards, in said city.

2. To the second interrogatory on behalf of the Complainant, he says: I was in the employ of the Baltimore and Ohio Railroad Company, and entered into its employ in eighteen hundred and thirty, and before any of the road was in use; and I remained with it until about August, eighteen hundred and thirty-six. When I first entered its employ, I was auditor; and afterwards superintendent of transportation, and also superintendent of the road. The two last offices I performed until I left the road; and I acted as auditor for some time after I received the appointment of superintendent of transportation, and until the duties of superintendent required my whole time.

3. To the third interrogatory on behalf of the Complainant, he says: I know the said Complainant, Ross Winans, and became acquainted with him first in the city of Baltimore, before he was in the service of the Baltimore and Ohio Railroad Company, and when he was trying his experiments on his friction-wheels. Said Ross Winans entered the service of said company after I did, and I believe about the year eighteen hundred and thirty. His duties were the invention and improvement of machinery adapted to railroads. At the time said Winans entered the service of said company, every thing connected with railroads was new and almost untried in this country and in England, and said Winans was employed to invent and improve machinery adapted to the road. He was engaged because of his inventive powers.

4. To the fourth interrogatory on behalf of the Complainant, he says: I had the entire charge of the transportation-department of said company; and, as the master of transportation, I had the most ample means of knowledge relative to the number, kind, and description of cars used for transportation of passengers and freight, because all the road-machinery came under my control for use upon its completion; besides which, during their progress of construction, my attention was constantly drawn to the necessity of farther supplies of means of transportation.

5. To the fifth interrogatory on the behalf of the Complainant, he says: The examination of the number of cars was made in my department, and under my direction, and returns were made to me. The carpenter-department examined the condition. There was no

regular time for such examination ; and I cannot say how often, but it was done whenever I thought it expedient.

6. To the sixth interrogatory on behalf of the Complainant, he says : George Gillingham was the superintendent of machinery, and directed the construction of new or additional cars for use on the said road ; and the authority was vested in him, that is to say, said Gillingham issued the orders to make cars. Said Gillingham had nothing to do with the inventive part of the cars, but simply as superintendent issued the orders for the construction of the cars.

7. To the seventh interrogatory on behalf of the Complainant, he says : The Washington branch of said road was first opened for travel in eighteen hundred and thirty-five, he thinks.

8. To the eighth interrogatory on behalf of the Complainant, he says : The said Baltimore and Ohio Railroad was opened in eighteen hundred and thirty, and in May of that year, I believe ; and all the cars then had four wheels.

9. To the ninth interrogatory on behalf of the Complainant, he says : I cannot recollect when the first eight-wheel car was placed on said road, but it was very early after the business of the road began ; it might have been a year afterwards, and the said car was intended and used for the transportation of passengers. It was called the " Columbus," and was considered a great novelty.

10. To the tenth interrogatory on the part of the Complainant, he says : I do not think the eight-wheel-freight cars were introduced or used on said road until three or four years after the use of the Columbus on the road.

11. To the eleventh interrogatory on the part of the Complainant, he says : I was accustomed to visit frequently the workshops of the said company, during the years 1830, 1831, 1832, 1833, and 1834. I visited them very frequently. The said shops were situated at the Mount Clare depot of the company in Baltimore.

12. To the twelfth interrogatory on behalf of the Complainant, he says : I always understood that it was under Ross Winans' supervision and direction that the first eight-wheeled cars used on said road were constructed. When it became a common business to make them, he did not interfere with it. Winans' business was that of inventor, and seeing that his ideas were carried out.

13. To the thirteenth interrogatory on behalf of the Complainant, he says : Ross Winans, the Complainant, was the inventor of the eight-wheel cars used on said road. I always understood so, and never heard it disputed until suits were instituted ; and I believe him to be the inventor of the eight-wheel cars used on the railroads of this country.

As superintendent of transportation, I had at first great difficulty in getting long timbers up the road ; and when difficulties of this kind occurred, I always applied to Ross Winans to find some remedy, which he always provided, and removed the difficulties ; and I have always believed, that from this Winans took the idea of the eight-wheel cars. In all the difficulties about the transportation, either in regard to the cars, machinery, or the breaks, I always applied to

Winans to provide the necessary contrivances; and he always provided them.

14. To the fourteenth interrogatory on behalf of the Complainant, he says: While I was in the employ of the said company, the said Conduce Gatch was the foreman of the wood-work done in the shops; and I would say that said Gatch has no authority to direct the construction of a new kind of car or an additional car, unless orders were first given him for it, and upon plans approved by the company.

15. To the fifteenth interrogatory on the part of the Complainant, he says: I am not aware that I know any thing further relating to said invention of advantage to the Complainant in maintaining his suit against the Defendants.

(For Cross-interrogatories, see p. 273.)

X 1. To the first cross-interrogatory on the part of the Defendants, he says: I am not an engineer, and never built an eight-wheel car.

X 2. To the second cross-interrogatory on the part of the Defendants, he says: I have not stated that Ross Winans alone had authority to direct the construction of new or additional cars on said road. The President, the Engineer, or Mr. George Brown, might have ordered a car to be made. Winans' duty — and for that purpose he was employed by the company — was to invent machinery. Winans was the inventive officer of the company. His business was not to attend to the construction further than to see that his plans and ideas were carried out or developed. When Winans invented a car, and saw in the construction of the first car that his ideas were carried out, and there was no improvement to be made, his business ceased in relation to it, and he was not required to attend to the superintendence of other cars of the same kind. In reference to the authority conferred on him, I know that he was employed by the company to invent machinery; but how employed, whether in writing, print, or verbally, I cannot positively say, but I believe by a contract and salary; and I think I once saw it, but have it not now, or the means of furnishing a copy of it. His duties were well known to all the officers of the company; and when any invention was required, or remedy required, in regard to the machinery, he was applied to to furnish it. I know of no other person in said company, except those I have mentioned, who had authority to make, improve, or change, or build cars. I did not feel that I had any authority to do so. I built two cars while in the employ of the company without authority, but not in their workshops, but at my own expense and risk elsewhere, and the company afterwards paid me the cost of construction.

X 3. To the third cross-interrogatory on the part of the defendants, he says: I cannot state the names of all the workmen, and did not know all their names, nor can I state what they were at work upon. I recollect Oliver Cromwell, who was a carriage-maker, and also Glenn, Conduce Gatch, Reuben Aler, and Eichelberger, all of whom

were wheelwrights, I believe, but worked in the carriage-making shops. Cromwell, I think, had a shop of his own.

X 4. To the fourth cross-interrogatory on the part of the Defendants, he says: The first car was the Columbus; afterwards, I recollect the Winchester and the Dromedary, and then the cars now in use, with some modifications of them, were put on the road.

X 5. To the fifth cross-interrogatory on the part of the Defendants, he says: I cannot state any direction or directions given by said Winans in relation to said cars.

X 6. To the sixth cross-interrogatory on the part of the Defendants, he says: I have stated the names, as far I can recollect, in my answer to the third cross-interrogatory.

X 7. To the seventh cross-interrogatory on the part of the Defendants, he says: I have made an inquiry for Mr. Winans, but have never received, or was entitled to receive, any remuneration from him. I have never accomplished any business for him, and there is no intimacy between us.

X 8. To the eighth cross-interrogatory on the part of the Defendants, he says: Two common platform four-wheel cars were employed to carry timber which rested on movable bolsters in the centre of each car, and this was done before the Columbus was designed or commenced, and almost at the beginning of the road; but the difficulty was to keep them from running off the road or track, and I applied to Winans for the means of preventing this, and he devised the means of doing so.

X 9. To the ninth cross-interrogatory on the part of the Defendants, he says: That he does not remember this.

X 10. To the tenth cross-interrogatory on the part of the Defendants, he says: I have no interest whatever, direct or indirect, in the success of said Winans' said patent. I did not see, nor did I hear, any of the Plaintiff's direct interrogatories, before this my examination.

WILLIAM WOODVILLE.

UNITED STATES OF AMERICA,

[L. S.]

THE CIRCUIT COURT OF THE UNITED STATES, WITHIN AND FOR THE MASSACHUSETTS
DISTRICT.

MASSACHUSETTS DISTRICT, ss.

To John Carrere or Levin Gale, of Baltimore, in the District of Maryland, Esquires, U. S. Commissioners, or John Hannan, of said Baltimore, U. S. Commissioner.

Know ye, that, reposing confidence in your wisdom, prudence, and fidelity, we have appointed, and by these presents do authorize and empower, you to take the answers to the interrogatories hereunto annexed, of William B. Slack, William Owens and Henry R. Reynolds and Oliver Cromwell, of Baltimore, in the District of Maryland, and Michael Glenn, of Easter Neck Island, Kent County, in said District; witnesses to be examined on behalf of the Complainant, and to be used in a certain cause now pending in said Court, wherein Ross Winans is Plaintiff, *vs.* the Eastern Railroad Company, Defendant, in equity. And to this end, at certain days, to be by you appointed for that purpose, to cause said witnesses, as aforesaid, to be brought before you; and each witness, while present before you, to examine carefully on oath touching the premises. And when you shall have taken the examination as aforesaid, to reduce or cause the same to be reduced to writing, and to be subscribed by each of said witnesses, in your presence. And the same, so taken and subscribed, to return, together with this Commission, and your doings herein enclosed, sealed and directed to the Circuit Court aforesaid, holden at Boston, as soon as the same may be executed.

In testimony whereof, we have caused the seal of the said Circuit Court to be hereunto affixed.

Witness, the Honorable Roger B. Taney, at Boston, this sixteenth day of February, in the year of our Lord one thousand eight hundred and fifty-four.

H. W. FULLER, *Clerk.*

N. B. — You shall not, except by consent of the parties in writing, permit either party to attend at the taking of the depositions, either himself, or by any attorney or agent, nor to communicate by interrogatories or suggestions with the Deponents whilst giving their depositions, in answer to the interrogatories annexed to this Commission. And you shall take such depositions in a place separate and apart from all other persons, and permit no person to be present during such examination, except the Deponents and yourself, and such disinterested person (if any) as you may think fit to appoint as a clerk, to assist you in reducing the depositions to writing. And you shall put the several interrogatories and cross-interrogatories to the Deponents in their order, and take the answer of the Deponents to each, fully and clearly.

[Depositions to be taken on paper of either size with this Commission.]

UNITED STATES OF AMERICA.

[L. S.]

THE CIRCUIT COURT OF THE UNITED STATES, WITHIN AND FOR THE MASSACHUSETTS
DISTRICT.

MASSACHUSETTS DISTRICT, ss.

To Henry M. Paine, Esq. of Hallowell, in the District of Maine.

Know ye, that, reposing confidence in your wisdom, prudence, and fidelity, we have appointed, and by these presents do authorize and empower, you to take the answers to the interrogatories hereunto annexed, of Washington O. Frost, of Hallowell, Maine, witness to be examined on behalf of the Complainant, and to be used in a certain cause now pending in said Court, wherein Ross Winans is Plaintiff, *vs.* The Eastern Railroad Company, Defendants, in equity.

And to this end, at certain days to be by you appointed for that purpose, to cause said witnesses, as aforesaid, to be brought before you, and each witness, while present before you, to examine carefully on oath touching the premises. And, when you shall have taken the examination as aforesaid, to reduce or cause the same to be reduced to writing, and to be subscribed by each of said witnesses in your presence; and the same, so taken and subscribed, to return, together with this Commission and your doings herein, enclosed, sealed, and directed to the Circuit Court aforesaid, holden at Boston, as soon as the same shall have been executed.

In testimony whereof, we have caused the seal of the said Circuit Court to be hereunto affixed.

Witness, the Honorable Roger B. Taney, at Boston, this twenty-ninth day of June, in the year of our Lord one thousand eight hundred and fifty-three.

H. W. FULLER, *Clerk.*

N. B. — You shall not, except by consent of the parties in writing, permit either party to attend at the taking of the deposition, either himself, or by any attorney or agent, nor to communicate by interrogatories or suggestions with the Deponent whilst giving his deposition in answer to the interrogatories annexed to this Commission. And you shall take such deposition in a place separate and apart from all other persons, and permit no person to be present during such examination, except the Deponent and yourself, and such disinterested person (if any) as you may think fit to appoint as a clerk, to assist you in reducing the deposition to writing. And you shall put the several interrogatories and cross-interrogatories to the Deponent in their order, and take the answer of the Deponent to each, fully and clearly.

[Depositions to be taken on paper of like size with this Commission.]

UNITED STATES CIRCUIT COURT, }
MASSACHUSETTS DISTRICT. — Oct. Term, 1853. }

ROSS WINANS *vs.* THE EASTERN RAILROAD COMPANY,

IN EQUITY.

Interrogatories to Henry R. Reynolds, of Baltimore, on behalf of the Complainant.

1. What is your name, age, business, and residence ; and how long have you been engaged in said business ?

2. Were you at any time in the service of the Baltimore and Ohio Railroad Company ? If yea, during what period and in what department were you so employed, and what duties did you perform ?

3. Were you acquainted with Ross Winans, the Complainant, in the service of said company ? If yea, when did you know him in such service, in what department was he engaged then, and what were his duties therein ?

4. If you say you were in the service of the said company, please state what kind of cars were used on its road while you were in their employ, for the transportation of merchandise, flour, stone, fire-wood, timber, &c.

5. When, if at any time, and under what circumstances, did you first have knowledge of an eight-wheeled railroad car ? Who was the inventor, and by whom was its construction superintended ?

6. By what means were the workmen enabled to construct the said eight-wheeled car ? And if you shall say by means of a drawing or plan, state who furnished said drawing, and also state what said drawing represented, and with what kind of wheels and boxes the axles thereof were fitted.

7. If you say that said drawing represented an eight-wheel car, please state what parts of such car were shown therein. State all the parts.

8. By what name was said car called, and in what manner was it spoken of, familiarly, at that time ? State whether or not its mode of construction was like or unlike other cars or car on said road at the time ; and how it differed, if at all.

9. Please examine the drawing now shown you by the Commissioner, marked "Oliver Cromwell, No. 1," and state whether or not you have ever seen and examined it before. If yea, when, where, and for what purpose, did you first see or examine it ?

10. Please state whether or not the said drawing now has upon it any other lines, marks, or illustrations than it had when you first examined it ; and, if yea, point them out.

11. Please examine the drawing hereto annexed, marked "Columbus," and state whether or not it accurately resembles the aforesaid drawing, mentioned in ninth interrogatory ; and, if not, state wherein it differs.

12. Are you acquainted with the so-called "Winans' friction-wheel and box?" and, if yea, state whether or not the same was in use on the four-wheeled cars used on said road during the winter of 1830, 1831. When was such wheel and box first used thereon?

13. Were you acquainted with Conduce Gatch, in the service of said company, while you were connected with it? And, if yea, state what, if any thing, he had to do with the shops in which the said car Columbus was built.

14. Please state whether or not you ever heard the said Gatch speak of the car "Columbus," or of its inventor. If yea, of whom did he speak as being the inventor thereof?

[Objected, to as immaterial, or, if used to control Gatch, no foundation is laid by first putting the question to him.]

15. Have you any knowledge respecting the transportation on said road, during the month of December, A. D. 1830, from Baltimore to the Relay House at Elk Ridge, of the horses and carriage of the late John Quincy Adams? And state whether or not you had any thing to do with the arrangements for such transportation. If yea, state particularly the manner in which such transportation was effected, and what preparations or arrangement was made for the purpose.

16. If you say you assisted in making the necessary preparation and arrangement, state how many cars were used for the purpose, what kind of cars they were, and how many wheels they had each. And state whether or not the said horses and carriage were transported upon one or more than one car; and, if upon more than one, state in what manner each car was arranged and prepared for the purpose.

17. If you know any other matter or thing relating to the subject-matter of this suit, of benefit to the parties at issue, or either of them, please state the same, fully and particularly.

C. P. CURTIS, JR., *Complainant's Solicitor.*

Special Cross-interrogatories to Henry R. Reynolds.

X 1. If, in answer to the fifth interrogatory, you say that Ross Winans invented the eight-wheel car, will you state whether you know that fact of your own personal knowledge, or whether you had formed that opinion from any facts that are or were known to you? And, if from facts, will you carefully state all the facts which you know of your own personal knowledge to be true, and upon which you rely as the foundation of the opinion which you have expressed, if any?

X 2. If, in answer to the sixth direct question, you undertake to state what the drawing or plan represented, and what parts of the car were represented, will you state also your answer to the following inquiries, relating to the same plan or drawing,—where, when, and in whose hands you first saw it? What was being done with it, at

that time? Was it, or was it not, then smoked? Was it or not then painted yellow in parts? Was it or not covered with cloth on the back? Are you aware that it has been altered since it was first made, and since the car Columbus was built? Was your attention particularly called to the state of the plan at that time? If so, how did it happen? Do you know of your own knowledge who it was that got it up, or made the drawing? When, where, and by whom were the alterations made upon the plan, subsequently to the building of the Columbus?

X 3. If you answer the fourteenth question, will you state where, when, and what was said by Mr. Gatch; and who was present? State the *year* and date, and how the conversation arose, and all that *he said*, or that was said to him.

X 4. Will you state when said Winans' friction-wheel and box was first introduced into said Baltimore and Ohio Railroad; how long it continued to be used; and whether Winans did not make many experiments relating to the same, from 1830 to 1834; and whether it is now in use or not?

UNITED STATES CIRCUIT COURT, }
MASSACHUSETTS DISTRICT. }

ROSS WINANS *vs.* THE EASTERN RAILROAD COMPANY.

IN EQUITY.

Interrogatories to William B. Slack and William Owens, of Baltimore, in the State of Maryland, on behalf of the Complainant.

1. What is your name, age, business, and place of residence?

2. Were you ever in the service of the Baltimore and Ohio Railroad Company? If yea, when did you enter its service? How long did you continue in it, and what was your position and duty therein?

3. Do you know the Complainant, Ross Winans? If yea, when and where? If in the employ of any railroad company, state what railroad company he was then in the service of, and in what capacity. What was his position and duty, and how long did he continue in the service of said company?

4. What has been his business, and where has been his place of business since he left the service of said company? and when did he leave the said service?

5. When you entered the service of the said company, how many wheels had the tonnage, freight, or burden-cars used on the said railroad, for transporting flour, merchandise, cord-wood, timber, stone, horses, mules, cattle, &c?

6. Will you describe the mode in which long timber was transported on said road when you became connected with it? Stating what was the length and the dimensions, square, of such timber; how many wheels the cars so used had; and in what manner the cars were

arranged to carry it. To what part and where the attachment for draft was made.

7. Please state whether or not, in such case, the cars were connected independently of the load of timber; and, if yea, in what manner. What effect was produced if the said connection was broken or removed?

8. At what time, and for what kind of transportation, was the first eight-wheeled car used on said road, whether for passengers or freight?

9. Who invented or planned the said car, and by what name was it called when spoken of?

10. Examine the drawings annexed, marked "Columbus," and state whether or not it represents said car? If not, point out the difference.

11. When was the Washington Branch of said railroad opened for use?

12. What other eight-wheeled cars, if any, were used on said Baltimore and Ohio Railroad, prior to the opening of the said Washington Branch? For what kind of transportation were they intended and used? Who invented them, and furnished the plans from which they were built? When were they placed on said road for use? To what part of each, the body or trucks, was the attachment for draft applied? What had you to do with either of said cars, and which?

13. Look at the drawings hereto annexed, marked W. D. and C. respectively; and state what they each purport to represent. And state wherein they or either of them differ, if at all, from the car which you shall say they represent.

14. Whether or not were any alterations made in either of these cars? If yea, in which, and what were they? By whose directions were such alterations made?

15. Were you acquainted with the so-called "Washington cars"? If yea, upon what road, and when were they first used? Who furnished the plans upon which they were built? And state whether the draft was applied to the body or the trucks thereof.

16. Look at the drawing annexed, marked "W. B." and state what it represents or purports to represent, and state whether or not it is an accurate representation thereof. If not, wherein it differs.

17. To what extent have you ridden in the said Washington cars; and at what rate of speed were they commonly run? At what high rate of speed have you ridden in them? How long were they kept in use, and in what manner did they carry their loads as regards ease and safety?

18. When did the use of eight-wheel tonnage, freight, or burden cars commence on the said trunk-road and branch, for the transportation of flour, merchandise, fire-wood, timber, stone, horses, cattle, &c.?

19. What quantity of cord-wood was a load for a four-wheeled car, and what quantity for an eight-wheeled car, on said road and branch?

20. To what extent did the eight-wheeled passenger, tonnage, freight, or burden-car come into use on said road and branch, before you left the service of said company, for the transportation of passengers, merchan-

dise, flour, cord-wood, stone, horses, cattle, &c., as compared with such transportation on four-wheeled cars?

21. In what light has the eight-wheeled car been regarded, as compared with the four-wheeled car for similar purposes, year by year, since its first use on said road?

22. Which kind of car, the four-wheeled or the eight-wheeled, carries its load with the least disturbance or injury to the load, and to which with the least injury to the road? Which is the safest, when used in trains at high rates of speed?

23. How many eight-wheeled cars, and how many locomotive engines, if any, constructed according to the following description, have you known to be in use on said railroad and branch; and during what period of time have you known such trucks to be used on said road and branch, viz.:—

“The wheels on each side of the truck are to be placed very near to each other; the wheels connected together by means of a very strong spring, say double the usual strength employed for ordinary cars; the ends of which springs are bolted or otherwise secured to the upper side of the boxes which rest on the journals of the axles, the larger leaves of the springs being placed downwards, and surmounted by the shorter leaves; the two pairs of wheels thus connected together are united into a four-wheeled bearing carriage, by means of their axles, and a bolster of the proper length, extending across between the two pairs of wheels, from the centre of one spring to that of the other, and securely fastened to the tops of them. This bolster to be of sufficient strength to bear a load on its centre of four or five tons.”

24. At what regular rate of speed, and at how high a rate of speed, have you known such cars and locomotives, inquired of in the next preceding interrogatory, to be safely used on said road and branch?

25. As a railroad operator, how do you regard such trucks in eight-wheeled cars, as to safety and ease to the car and load, when used in trains at the usual rate of speed?

26. At what distance apart were the flanges of the wheels in the trucks of the cars and engines used on said road, while you were connected with it? State as near as you can.

27. Do you know, or can you set forth, any other matter or thing which may be a benefit or advantage to the parties at issue in this cause, or either of them, or that may be material to the subject of this your examination on the matter in question in this cause? If yea, set forth the same fully and at large in your answer, as if fully interrogated thereto.

C. P. CURTIS, JR., *Complainant's Solicitor.*

UNITED STATES CIRCUIT COURT, }
 MASSACHUSETTS DISTRICT. — October Term, 1852. }

ROSS WINANS vs. EASTERN RILROAD COMPANY,

IN EQUITY.

Interrogatories to Oliver Cromwell, of Baltimore, Maryland; Michael L. Glenn, of Easter Neck Island, Kent County, Maryland; and Washington O. Frost, of Hallowell, in the State of Maine, on behalf of the Complainant.

1. What is your name, age, business, and residence? How long have you been engaged in said business, and where?

2. Do you know Ross Winans the Complainant? If yea, when and where did you first become acquainted with him? How and where was he then employed?

3. If you say you knew him in the service of the Baltimore and Ohio Railroad Company, please state during what years there [you] knew him? What were your duties while in that service? and, if you had different duties, how long were you employed at each?

4. In what department was Ross Winans then employed, and what opportunity had you to observe his operations?

5. When, where, and in what way, did you first have knowledge of an "eight-wheel" railroad car? who was the author of said car, and how or by what name was it called or known? For what purpose or use, and by whom, was it built?

6. If you say that said eight-wheel car was built by the said company, under the direction of said Winans, for use on its road, and was called the Columbus, please state whether or not you have any knowledge of any drawing thereof, and, if yea, under what circumstances and when did you first see said drawing.

[Objected to, as leading.]

7. If you say you did see said drawing, please state by whom said drawing was shown to you, by whom it was made, and whether before or after the construction of the said car Columbus.

8. If you say that you saw such drawing prior to the construction of the said car, please state in what condition or progress the said drawing then was, and whether or not it represented a complete car with body and running gear, or how otherwise.

[Objected to, as leading in form, and as inquiring of the witnesses to state by parol the contents of a written paper or drawing, the original being in Complainant's possession.]

9. When and where did you last see said drawing? and whether or not had the same, when you last saw it, been altered in any way since you first saw it? If yea, in what particular? Please examine the drawing hereto annexed, marked "car Columbus, February, 1831;"

and state whether the same is a copy of the said original drawing of the Columbus, and, if not, wherein does it differ.

[Objected to, for the same reasons as in the preceding.]

10. Whether or not do you know of any copy being made or dimensions taken of or from said original drawing, by any one? And, if yea, state by whom, when, and where it was done, on what substance was it taken; and state all you know relating thereto.

[Objected to, as leading.]

11. If you say that such copy was made or dimensions taken, please state whether or not any and what parts of the said car Columbus were constructed by means of said copy or dimensions, and by whom.

12. Did you work upon said car Columbus during its construction? If yea, upon [what] part of the same were you employed? What other persons were employed upon it, and what part did each work upon? State as fully as you can recollect.

13. How long a time was the said car in the course of construction, and which part was first completed, the body or running-gear?

14. What kind of journal-boxes had the running-gear of the said car? and, if you say they were adapted to permit the axles and wheels partially to conform to the curves of the road, please explain in what manner such adaptation was effected.

[Objected to, as leading.]

15. To what part of the said car Columbus was the draft applied?

16. Whether or not were any alterations made in the said car after it had been put on the said road for use? If yea, please to describe such alterations or modifications fully, and state the reasons for making the same; for what object were they made?

17. What attention, if any, did the said Winans give to the construction or alteration of the said car? What part did he take in the same? Did he give any instructions touching the same, and, if yea, where did he give them?

18. Please state, if you know, where and when the said car Columbus was first put in use; and state whether or not it gave satisfaction, or answered the purposes for which it was intended, and, if not, wherein did it fail to answer such purposes.

19. Whether or not was the said car safe for use as a passenger-car, and, if not, why not? Was it not or often used on said road? and, if not, for what reason?

20. Whether or not were any other cars built on the said road of the plan and proportions of the Columbus, and, if not, why not? If yea, how many?

21. Please state, as near as you can, when the Washington Branch of the Baltimore and Ohio Railroad was opened for travel?

22. Whether or not you know of any cars called "Washington" cars being used on said railroad, or on said branch, and, if yea, when and where were said cars first built and used? By whom were they

designed or constructed? State fully all you know about their invention and use.

23. Please describe the "Washington" car, and state wherein it differed, if at all, from the car Columbus, and from the American eight-wheel railroad car now used.

24. What other, if any, eight-wheel cars were built for use on said road before the building of the "Washington" car. Please to give the names and a description of each, and state wherein they differed from each other, the object and reason for such difference, and where the draft was applied to each. Please state the order in time when each was constructed and put in use, with the reasons why each one was built.

Under whose directions were they constructed, and who furnished the plans for the same?

25. Whether or not were any alterations or changes made in these cars after they were put on the road, and, if yea, state what such alterations were; why they were made, and under whose direction.

26. State, if you know, when eight-wheel freight or burden-cars were first used on the said Baltimore and Ohio Railroad?

27. In what kind of cars were wood, stone, and other merchandise transported over said road during the years 1830, 1831, 1832, 1833, and 1834?

28. Whether or not was there any peculiar arrangement used on said road for transporting wood during the years enumerated in the preceding interrogatory, and, if yea, what was it?

29. Who was the Master of Transportation on said road prior to the year 1836, and what were his duties?

30. Who claimed the invention of the said eight-wheel cars put on said road prior to the year 1835?

31. Whether any one, and who, was spoken of and commonly known as the inventor of the said eight-wheel cars, including the Washington car?

[Objected to as inquiring into hearsay.]

32. Whom do you consider or believe to be the inventor of the American eight-wheel car, and upon what grounds do you form your opinion or rest your belief?

[Objected to, as inquiring of witnesses an *opinion* upon facts.]

33. Have you examined the Letters Patent issued to the Complainant, Ross Winans, dated October 1st, 1834, for his "Improvement in the construction of cars or carriages for railroads," and the specification thereto annexed? If not, please examine the specification hereto annexed. If yea, please to state whether or not they are, in your opinion, a sufficient guide for one skilled in mechanics or in constructing cars and carriages, to enable him to construct the separate parts of an eight-wheel railroad car, suitable for the transportation of passengers and merchandise on railways at the usual rates of speed? If not, why not?

[Objected to, as the witnesses are not and are not proved to be experts, or used to the business of building the running-gear of railroads, or otherwise qualified as scientific experts.]

34. Whether or not, in your opinion, does the said specification describe the eight-wheel car in general use upon railroads at this time? If not, why not?

[Objected to, for the same reason as No. 33.]

35. Whether or not does the said specification describe the car Columbus aforesaid? If not, wherein does it differ? State fully and particularly.

[Objected to, as leading, also for same causes as the No. 33.]

36. Whether or not does the said specification, in your opinion, describe the said "Washington cars," so called? If not, wherein does it differ?

[Objected to, as leading, and for same causes as No. 33.]

37. [*De bene esse.*] Were you acquainted with Conduce Gatch, upon the said Baltimore and Ohio Railroad, or in their employ? If yea, state when it was, and what were his duties, situation, and occupation, in the service of said company; and what relations did you hold with him at that time?

38. [*De bene esse.*] Whether or not you were under any private engagements with said Gatch, while he and you were in the employ of the said company? If yea, what were they? To what extent were you in his company?

39. [*De bene esse.*] Whether or not you ever heard the said Conduce Gatch speak of the invention of the said car Columbus, or of the eight-wheel car now in general use? And, if yea, what did he say respecting the invention of either, and which? Who did he say was the inventor thereof?

40. If you recollect any other facts in reference to the "eight-wheel car," tending to prove the said Winans the inventor thereof, please to state the same as fully and particularly as if specially interrogated about the same.

41. Please look at the drawing hereto annexed, marked car "Dromedary," Baltimore and Ohio Railroad; and state what it purports to represent, and whether it is or not a true representation thereof

[Objected to, as requiring witness to state the purport of a written and drawn document in Plaintiff's possession, and as leading in form.]

42. Please look at the drawing annexed, marked "Car Comet, Baltimore and Ohio Railroad;" and state what it represents, and whether or not it is a true representation thereof.

[Objected to, as leading.]

43. Please look at the drawing annexed, marked "A." and state

what it is, and also state wherein it differs from the "Washington car," so called, if at all.

44. How many eight-wheel cars, constructed according to the aforesaid Letters Patent and specification, have been made and used on the Baltimore and Ohio Railroad, since their first introduction? State as near as you can form a judgment.

C. P. CURTIS, JR., *Complainant's Solicitor.*

CIRCUIT COURT OF THE UNITED STATES, }
DISTRICT OF MASSACHUSETTS. — October Term, 1852. }

Cross-interrogatories to Oliver Cromwell, on behalf of the Defendant.

(45.) X 1. Who had charge of the shops at Mount Clare Depot, when the Columbus was built?

(46.) X 2. Who was foreman there?

(47.) X 3. Who worked on the body, and who on the running gear or trucks of the Columbus?

(48.) X 4. Was Gatch about the shop where the running gear was made, about all the time? Was he boss of the work?

(49.) X 5. Was he boss over the wood-work also?

(50.) X 6. What difference was there between the car Columbus and the drawing on paper?

(51.) X 7. Do you mean to say positively, that you *heard* Winans give Gatch any directions about the construction of the running gear? Or were his directions about the body-part?

(52.) X 8. If yea, what did he say?

(53.) X 9. *Where* was Winans' office at this time; and where did his employment lie? How far was his office from the shop where you were at work?

(54.) X 10. Can you swear that *you, yourself*, HEARD Winans claim that he was the first inventor of the *running gear* on the body of the car Columbus, while she was being built?

(55.) X 10½. Will you describe how the bolsters placed on the platform of the burthen-cars [when these cars were run two together, that is, one at each end of a long load of timber or wood] were connected together? How fastened?

(56.) X 11. Did you ever talk with Conduce Gatch about who was the inventor of the *eight-wheel truck*, or the double-truck burthen-cars?

WILLIAM WHITING, *Respondent's Counsel.*

UNITED STATES CIRCUIT COURT, }
DISTRICT OF MASSACHUSETTS. }

ROSS WINANS vs. EASTERN RAILROAD COMPANY,

IN EQUITY.

*Additional Interrogatories to Oliver Cromwell and Michael Glenn,
Witnesses on behalf of the Complainant.*

(57.) 1, *additional*. When were each of the said eight-wheel cars called Winchester, and Dromedary, and Comet, placed on the said railroad for use?

(58.) 2, *additional*. Have you any knowledge of the arrangement of any four-wheeled cars at the shops of the said Baltimore and Ohio Railroad during the month of December, A. D. 1830, for the transportation of the horses and carriage of the late John Quincy Adams, on said road? If yea, describe the manner in which the said cars were arranged to carry the said horses and the said carriage; and, if you had any thing to do with such arrangement, state by whose direction it was, and what you did.

(59.) 3, *additional*. If horses, mules, &c., were carried on said road on four-wheeled cars prior to the year 1835, describe the extent to which it was done, and the manner in which the cars were arranged for such purpose.

(60.) 4, *additional*. State whether or not the eight-wheeled car, before mentioned, called the Columbus, was constructed from a plan or drawings, or how otherwise? If yea, state, if you know, by whom said drawing was made. When did you first have knowledge of said drawing; and under what circumstances did you first see it?

(61.) 5, *additional*. What part or parts, if any, of a railroad car did the said drawing exhibit?

(62.) 6, *additional*. What use was made of said drawing after the said car was completed; and how long did such use of the said drawing continue?

(63.) 7, *additional*. State, if you know, what were the circumstances attending the removal of the said drawing from the said use to which it had been applied. And with whom were you employed at the time?

(64.) 8, *additional*. What was the condition and appearance of the said drawings when so removed?

(65.) 9, *additional*. Will you examine the drawing now shown you by the Commissioner, marked Oliver Cromwell, No. 1, and state what it is?

[Objected to, as said drawing is not filed, nor shown to Respondent's Counsel.]

(66.) 10, *additional*. If you say it is the original drawing before mentioned, please examine it closely, and state whether or not it has

any lines, marks, or figures upon it now, which were not upon it when you first saw the same. And, if yea, state what they are, and what they indicate.

(67.) 11, *additional*. If you know, or can set forth, any other matter or thing of benefit to the parties at issue in this case, or either of them, pertinent to the matters at issue, please do so, fully and particularly.

C. P. CURTIS, JR., *Complainant's Solicitor*.

UNITED STATES CIRCUIT COURT, }
MASSACHUSETTS DISTRICT. }

ROSS WINANS vs. THE EASTERN RAILROAD COMPANY,
IN EQUITY.

Cross-interrogatories filed on the part of the Respondent, and to be propounded to OLIVER CROMWELL, Michael Glenn, William B. Slack, William Owens, and Henry R. Reynolds, of Baltimore.

(68.) X 1, *additional*. Were there not from 1829 or 1830 to 1834, inclusive, distinct and separate shops, in which the different departments of car-building were carried on; namely, the blacksmiths', the painting, the wood-work for the bodies, and the truck-shop? And will you state who had the immediate and personal superintendence of each of these shops respectively?

(69.) X 2, *additional*. How many hands or workmen were employed in each of said shops? Please give the names of all the workmen you were personally acquainted with, and state what shops each one worked in, in the years 1830, 1831, 1832, 1833, and 1834, or in any part of either of said years. Have you now stated the names of all whom you knew during either of these years?

(70.) X 3, *additional*. Were you ever acquainted with George Gillingham? If so, when did you first become acquainted with him, and how long did you know him? Was he superintendent of the Baltimore and Ohio Railroad, and for and during what years? Do you know what were his duties? What were they? And how do you know of your own knowledge what they were?

(71.) X 4, *additional*. Was Jonathan Knight Chief Engineer of the Baltimore and Ohio Railroad? If so, when, and for how long; and when did he cease to hold that office? What were his duties in the service of the said company; and how do you personally know what his duties were?

(72.) X 5, *additional*. If, in any one of your answers to any direct or cross-question, you have undertaken to state any thing in relation to the powers, duties, or authority, or want of authority of Ross Winans or Conduce Gatch; will you now state whether you know, of your own personal knowledge, the facts you have stated; and whether you derive any part of your knowledge from statements or information

received from others; and will you please state what part of your statement is derived from one source, and what from the other? And if it is derived from any written or printed documents, will you annex the originals, or true and carefully prepared copies of each of said documents?

(73.) X 6, *additional*. What was the fastest rate of speed at which the Columbus, Winchester, Dromedary, or Comet ever ran, according to the best of your knowledge? *When* did they so run; and what was the usual and ordinary speed at which each of those cars ran in the years in which they were respectively built, and in the years 1834 and 1835?

(74.) X 7, *additional*. Do you know of your own knowledge, and without regard to information derived from others, the date, that is, the day of the month and the year, when the plan, drawing, or design of the car Columbus was first drafted or made,—if any such plan was ever made,—did you see it made or drafted in your presence? If so, when, where, and by whom, was said drawing made?

(75.) X 8, *additional*. If you have said in any part of your examination, that Ross Winans gave any directions about building the car Columbus, or that said car was built under his directions or superintendence, do you mean to be understood that said Winans had a general superintendence of the department in which said car was built? If so, do you make what statements you have made on that subject from your own personal knowledge; and will you state all the facts which you have personal knowledge of, that enable you to state what said Winans' superintendence actually was?

(76.) X 9, *additional*. If you have said that the car "Columbus" was invented by Ross Winans, or built or constructed by or under the directions or superintendence of Ross Winans, will you state the names of each of the persons who built it; the language or substance of the language of each and every direction you personally heard given to any and every workman; the name of each workman who received such directions; and the names of all persons present at the time when such directions were given; what shop or shops the men were in who received such direction; and the time when each was given?

(77.) X 10, *additional*. Do you know of your own knowledge that the car Columbus was built in all respects like the drawing shown to you by the Commissioner, marked "Columbus"? If not, in what particulars did they differ?

(78.) X 11, *additional*. *Where* and when did you last see said car Columbus; and what became of her?

(79.) X 12, *additional*. What is the scale on which said drawing of the Columbus is made?

(80.) X 13, *additional*. If you have mentioned in your answers a car called the "Columbus," and have stated that you saw her at any time, will you answer the following questions relating to said car, as it was originally built? viz.:—What was the length, height, and width of her body; the size of her wheels; their distance apart in each truck; the distance of the two bearings of the body upon the

two trucks; the distance of the centres of the truck from the ends of the body; the length of the truck-frame; the size, shape, and position of her springs; the position of her bolsters and thorough braces; the construction of her wheel-frames; and every other important particular in her construction; whether it had said bearings as well as centre-bearings, and friction-wheel and boxes, &c., and was it drawn?

(81.) X 14, *additional*. Will you answer the same inquiries in regard to the car called the "*Winchester*"? Also the inquiries in regard to the car called the "*Dromedary*"? Also the same inquiries in regard to the car called the "*Comet*"? Also the same inquiries in regard to the cars called the "*Washington cars*"?

(82.) X 15, *additional*. If you have stated that Ross Winans furnished plans for any other cars besides the car Columbus, and previously to the Washington cars, will you state *what* plans you refer to in your answer? Will you annex the same, or a true copy thereof, to your answer? Did you see said plans yourself, at or before the time when said cars were building? Did you see any person drawing or making said plans? If so, when, where, and by whom, were they so drawn or made in your presence? How do you, of your own personal knowledge, know who did make said plans? And how do you know who was the author thereof; or who furnished them to any body? And did you personally see any of said original plans (if any ever existed) handed by one person to any other person, or furnished by one person to any other person, at or before the time when said cars were being built? If so, state to whom you saw said plan furnished. And, if you have stated that said Winans gave any directions to any body about the building of either of said cars, will you please to state when, where, and to whom, each one of said directions were given, and what was the language or substance of the same?

(83.) X 16, *additional*. Will you please to answer all the questions contained in the last preceding interrogatory, in relation to the so-called Washington cars?

(84.) X 17, *additional*. If you have made any statement in relation to the position, duty, or power of Mr. Conduce Gatch, while in the service of the Baltimore and Ohio Railroad Company, will you state all the services of your knowledge upon the subject, except hearsay or information derived from the statements of others? If you refer to any by-laws, rules or regulations, reports, or other written or printed documents, will you please annex the same, or give copies thereof to your answer?

(85.) X 18, *additional*. Do you know whether or not in fact Mr. Conduce Gatch did buy materials, hire men, and pay them off, superintend and give them directions with regard to their work upon the running gear of the railroad cars, from time to time, and in the shops of the company?

(86.) X 19, *additional*. [*De bene esse.*] If you have said, in any one of your answers, whom you *believe* to have been the inventor of the car "*Columbus*," or that at any time he had in his possession any drawing of said eight-wheeled car, will you please to say whether the original design of said car was made in your presence; and, if so, when,

where, and by whom, was it so made? Will you produce the same, or a true copy thereof, and annex the same to your answer; and state whether or *not* you have *personal* knowledge that the said supposed original design was actually used and followed in the construction of the said car "Columbus" by the workmen employed to build her? If so, who did you see in possession of it while the work was going on?

(87.) X 20, *additional*. If you have stated the name of any person as the one who designed the "Washington" cars, or constructed them, state whether you personally saw said design or plan made; and, if yea, when, where, and by whom, was it made; and will you annex a true copy of said original design or plan (to your answer), compared and certified by yourself, from which said cars were built? At what time were said cars commenced; who did the work upon the different parts of them; who did the wood-work; who built the trucks; and whether they differed from the Winchester, Dromedary, and Comet, in the construction of the trucks, and, if so, in what respects the trucks differed from those belonging to either of these cars; and will you particularly describe said Washington cars in the following respects: length, width, and height of the body, the size of the wheels, and distance apart of the centres of the axles in each truck; the size, shape, materials, and mode of construction of the truck-frames, the distance of the centres of the trucks from the ends of the platforms, whether they had side-bearings, how the trucks were connected with the body, and all other particulars relating to the construction of the running gear?

(88.) X 21, *additional*. Was the said car Columbus, as well as the Winchester, Dromedary, and Comet, put into public use for the transportation of passengers upon the Baltimore and Ohio Railroad? And if so used, for how long a time were they used; and at what dates were they respectively put into use; and was such use with the knowledge, approbation, and consent of said Winans; and how many years was each of said cars continued in use?

(89.) X 22, *additional*. Are you now, or have you ever been, and, if yea, when, in the service or employment of Ross Winans, or of any party interested in the eight-wheel car patent; and, if so, in what capacity? Have you now, or have you ever had, any interest directly or indirectly in this suit, or in the success of the said patent? Are you acquainted and have you conversed with any of the witnesses who have been examined in any of said Winans' suits upon the said patent? *Who* of said witnesses have been, or now are, in the employ of said Winans, or of the manufactory-establishment in which he is interested?

(90.) X 23, *additional*. If you have stated that you have known any cars for passengers, used ordinarily to run at high rates of speed, and which you say were constructed according to the mode set forth in the twenty-third direct interrogatory to Slack and Owens, or in any other manner which you have heretofore supposed to be according to said Winans' patent? will you state what were the ordinary rates of speed at which any cars mentioned by you in your answers were actually run; and do you know these rates of speed of your own

knowledge? Will you name the times and places at which each of said cars were made? Where, when, and by whom, each of said cars were run, if run at all? And will you answer, in respect to each of said cars, the following inquiries, viz.: What was the length of body, and mode of draft; the shape and extent of bearing of the upper upon the under bolster; and whether these were side-bearings or not; the construction of the trucks and truck-frames; the distance of the axles from each other in each truck; the distance of the flanges of the wheels; the *saddles* upon the springs; the size and shape of the springs, and the degree of motion which they ordinarily underwent, in the operations of the car upon the road; and whether used under locomotives or cars; whether they are now in use; and, if so, how many of them; and, if so, where, and by whom, and for what purpose; whether brakes are applied to them; and how and at what rates of speed they are ordinarily run. Have you any personal knowledge of the fact whether they have ever run off the track at any time? whether the track was flexible in its character of construction; whether the distance of the axles of the wheels from each other could be changed by the mere elevation or depression of the springs; what was the shape and size of each of the different springs used in each truck; what part of either of the bolsters was between the fore and hind wheels of the trucks; and whether there were not several of the lower leaves of each spring of equal length; and whether said springs were straight or curved; and how much they were deflected in the ordinary mode of loading and unloading the cars, and in running the same; and whether the bearings or boxes were outside or inside of the wheels?

(91.) X 24, *additional*. If, in answer to the twenty-third or any other interrogatory put to William Owens or Wm. B. Slack, you have stated that you have known cars, having trucks *such as are described in said twenty-third interrogatory*, to have been in use on any railroad, or under any locomotive, will you state whether they were the same that were built by James Murray, or Murray & Hazlehurst; will you state whether said trucks had not springs, in which several of the lower leaves were of the same length; were there not saddles upon said springs? And will you answer concerning the said trucks, inquired of in the said twenty-third interrogatory, the same questions put in the last preceding question: how long since new trucks, of precisely the same description, have been built and put in use on any of said roads?

(92.) [Twenty-fifth interrogatory omitted in Commission.]

(93.) X 26, *additional*. Do not the most recently built cars for passengers now have rigid wheel-frames, side-bearings; and are they not the same as those in common use on the northern roads? If not, wherein do they differ?

(94.) X 27, *additional*. Have you ever seen, heard, or read, or heard read or stated, or obtained knowledge, of the substance of any one of the direct or cross-interrogatories, which you have answered in the case, or of all of them? If yea, will you state when and where

you obtained such knowledge, who communicated it to you, or permitted you to learn, hear, see, read, hear read or stated, the substance of said or of any of said interrogatories or cross-interrogatories, at any time before giving your deposition before the Commissioners; and whether you have conversed with Charles D. Gould or Ross Winans, or their counsel, before giving your testimony? Have you heard, read, or obtained knowledge, of any of the testimonies or opinions given by other persons upon any of the questions put to you; or of any affidavits, or what purported to be copies of affidavits, given in any of said Winans' previous cases, relating to the patent on the eight-wheeled car? Are you acquainted with any of the witnesses who have been examined before Commissioners, or otherwise, in Mr. Winans' cases? If so, which of them have ever been, or are now connected in business with him or either of his sons; or have been employed by him or them; and in what capacity?

(95.) X 28, *additional*. If, in answer to any question or cross-question, you have stated any fact, will you now state whether each and every fact so stated by you were stated on your own personal knowledge, or have you derived them or either one of them from information, verbal, written or printed, obtained from others? And if from printed or written documents or statements, will you annex to your answer the entire document to which you refer as affording the information; or, if you cannot do so, will you annex a true copy thereof? And if you refer to any printed reports of the Baltimore and Ohio Railroad Company, will you, instead of copies thereof, state the truth of the report, the date and page thereof, and by whom it was written, or purports to have been written?

Special Additional Interrogatories to Oliver Cromwell and Michael Glenn.

(96.) 1, *special to additional*. Have you not been examined as a witness in the cases of Ross Winans before this time? If so, how many times?

(97.) 2, *special to additional*. Have you not been examined before the Commissioners, in the case of Winans *vs.* the Eastern Railroad, previously to this time, with a former Commission?

(98.) 3, *special to additional*. Did you, or did you not, as a witness, make any statements in relation to the drawing inquired of in the fourth direct question?

(99.) 4, *special to additional*. Will you now answer the second special interrogatory put to Henry R. Reynolds?

Cross Special Interrogatories to Oliver Cromwell.

(100.) X 1, *to special additional.* Did you not leave the service of the Baltimore and Ohio Railroad Company in October, 1831?

(101.) X 2, *to special additional.* Was not the car Columbus altered shortly after it was first built, by putting on a new bolster, and by bringing the wheels nearer together in each truck?

(102.) X 3, *to special additional.* Were not alterations made in the friction-boxes?

(103.) X 4, *to special additional.* Were not the alterations mentioned in the second question, above stated, made before you left the service of the said company, in October, 1831?

(104.) X 5, *to special additional.* Have you not stated on oath, upon a previous occasion, that you did not know of Mr. Winans having ever given any directions about the construction of the trucks to any one?

UNITED STATES CIRCUIT COURT, }
MASSACHUSETTS DISTRICT. }

ROSS WINANS *vs.* THE EASTERN RAILROAD COMPANY,

IN EQUITY.

Additional Interrogatories to Oliver Cromwell and Michael Glenn, by Complainant.

(105.) 1. Have you any knowledge of the use, upon any railroad, of "four-wheeled cars," of such proportions as are shown in the drawing annexed, marked "B. H. L." (see drawing B. H. L.)? If yea, where, when, and to what extent, were such cars used?

(106.) 2. When were eight-wheel freight-cars first used on said roads?

(107.) 3. Did you know Conduce Gatch in the service of the said Baltimore and Ohio Railroad Company? If yea, in what manner was he brought into the service of the said company, and what was his position and duty in its service?

(108.) 4. Whether or not had the said Gatch, while you were connected with the said company, authority to construct, or to order to be constructed, cars, at the expense of the said company, of other kinds or proportions than such as had been designated and approved by the officers of said company; and, if yea, during which period of time, and to what extent, had he such authority?

(109.) 5. Do you know, or can you set forth, any other matter or thing which may be of benefit or advantage to the parties in this cause, or either of them, or that may be material to the subject of this your examination on the matters in question in this cause? If yea, set forth the same, fully and at large, in your answer.

C. P. CURTIS, JR., *Solicitor for Complainant.*

UNITED STATES CIRCUIT COURT, }
DISTRICT OF MASSACHUSETTS. }

ROSS WINANS vs. THE EASTERN RAILROAD COMPANY,

IN EQUITY.

Additional Cross-interrogatories, to be proposed on behalf of the Respondent, to Oliver Cromwell and Michael Glenn.

(110.) X 1. If, in answer to the second additional cross-question, you have answered when the first eight-wheeled freight-cars were first used on any road, will you state whether you mean to include all kinds of temporary cars, such as there used to carry long pieces of timber, wood, &c., and which were made out of two four-wheel bearing-carriages, coupled by long timbers or otherwise? Were none of this description of arrangements used on the Baltimore and Ohio Railroad, before any regular eight-wheel cars for passengers were got up?

(111.) X 2. If you have answered the third direct question, will you read, or hear read, your answer thereto, and then state whether every word of your answer is upon your own personal knowledge; or is any part, and, if any, what part, derived from information you have received from other persons?

(112.) X 3. Did you see or know Mr. Conduce Gatch when he entered into the service of the Baltimore and Ohio Railroad Company? Where were you at that day; and what did you see, or have personal knowledge of, relating to the time, place, and manner, in which his services were secured by the company?

(113.) X 4. If you have undertaken to state, in answer to the third direct question, any thing in relation to the position and duties of Mr. Conduce Gatch, will you also state whether his duties in the service of the company were regulated by any rules, regulations, or by-laws of the company, or directions in writing, of the corporation; or how, and by what authority, his duties and position were defined? And will you annex all such documents, or true copies thereof, to your answer?

(114.) X 5. Was it not the duty of Mr. Conduce Gatch to obey the orders of the chief engineer, and of the superintendent, or other high officers of the railroad?

(115.) X 6. Did not Mr. Conduce Gatch hire workmen and pay them off; did he not buy materials and direct the workmen in the shop in which he superintended?

(116.) X 7. What shop did you work in; where, and how long, did you work there; and did Mr. Conduce Gatch work in the same shop with you?

(117.) X 8. If you have answered the fourth question, will you state how you know, if you do know, of your own personal knowledge, what authority Mr. Conduce Gatch had or had not; state all your

means of knowledge, except hearsay, or information derived from others.

(118.) X 9. What has been your business during each successive year, from 1830 to the present time? Where have you resided, and where do you now reside?

(119.) X 10. Have you ever been, and, if ever, when, in the employ of Ross Winans or Charles D. Gould, or of any firm in which either of these gentlemen is interested; and for what periods of time; and in what capacity?

(120.) X 11. Have you assisted or accompanied R. Winans or Mr. Gould, or taken any measures at any time to assist any person in seeing any other witness or witnesses, in the present, or in any other of Mr. Winans' cases? If yea, how often have you been so engaged, and by whom?

(121.) X 12. Where, and how, are you now, and have you recently been employed; by whom; in what capacity?

(122.) X 13. Have you or not talked over the subject of your testimony in this case, or in other similar cases, with Mr. Winans, or with Mr. Gould, or with other persons; if so, how many times; and with whom?

(123.) X 14. Have you now, or have you ever had, any interest whatever in the success of Mr. Winans' suits, or any of them; or any interest in the eight-wheel car-patent, or in any of the proceeds or profits thereof?

(124.) X 15. Have you ever assisted in getting evidence for the extension of said patent, or of any other patent of the Winans'? If yea, what have you done?

(125.) X 16. How many years did the 'car Columbus run upon the Baltimore and Ohio Railroad; and where did you last see said car; what finally became of her?

(126.) X 17. How many miles per hour was the fastest she ever ran with locomotive; and when did she first run at that rate?

(127.) X 18. When she was first built and put upon the road, did the flanges of the wheels run upon the outside or inside of the rails?

(128.) X 19. When was the change made from placing the flanges outside, to inside of the rails? How do you fix the date?

W. WHITING, *Respondent's Solicitor.*

*Deposition taken the tenth, eleventh, and twelfth days of January,
A. D. 1854, as follows:—*

OLIVER CROMWELL, a witness named in said Commission, being duly sworn and carefully examined on the interrogatories and cross-interrogatories addressed and propounded to him, and annexed to said Commission, and being examined on behalf of the Complainant in the said cause, deposes and says as follows:—

(For Interrogatories, see p. 286.)

1. To the first interrogatory on behalf of the Complainant, he says: My name is Oliver Cromwell; I am forty-five years of age; am a coachmaker by trade or occupation; and reside in the city of Baltimore. I have been engaged in said business since eighteen hundred and twenty-four, and during all that time, with the exception of two years, in the city of Baltimore.

2. To the second interrogatory on behalf of the Complainant, he says: I know Ross Winans, the Complainant; I first became acquainted with him in eighteen hundred and thirty, at the Baltimore and Ohio Railroad, where he (Winans) was employed by said railroad company in giving directions in regard to the construction of cars chiefly.

3. To the third interrogatory on behalf of the Complainant, he says: I knew said Winans in the employment of said railroad company from eighteen hundred and thirty (during the summer of that year) up to the fall of eighteen hundred and thirty-four, with the exception of from October, 1831, to the following June, during which time I was not in the employ of said company, having left it in October aforesaid, and returned to it in June following, as above stated. My duty in that service was to work on the bodies of passenger-cars, and to do such repairing to the bodies of passenger-cars running on the road as was necessary. I had no other duty.

4. To the fourth interrogatory on behalf of the Complainant, he says: Ross Winans was then engaged in giving directions in regard to the construction of cars, and I saw him frequently in and about the shop where I worked giving those directions.

5. To the fifth interrogatory on behalf of the Complainant, he says: In eighteen hundred and thirty-one, at the Mount Clare depot of the Baltimore and Ohio Railroad Company, I first had knowledge of an eight-wheel railroad car, when I was engaged in the construction of the body of said car. The author of said car was Ross Winans, and it was called the "Columbus." It was built for the purpose of carrying passengers on said road, and it was built at the work-shops of the company under Winans' direction. Francis Gatch and myself made the body, and Conduce Gatch made the running part.

6. To the sixth interrogatory on the part of the Complainant, he says: I have a knowledge of the drawing of said car "Columbus,"

and first saw it in the shop where I worked, when it was placed there to make the body by.

7. To the seventh interrogatory on behalf of the Complainant, he says: The said drawing was brought into the shop by Ross Winans, was explained by him to me in reference to the scale, and then left by him with me to make the body by. All that I know of the person by whom said drawing was made, is that Mr. George Brown told me that the said Winans was making a drawing of an eight-wheel passenger-car, and that Winans would bring it out to the shop, which he did, as before stated. This was before the construction of said car "Columbus."

8. To the eighth interrogatory on behalf of the Complainant, he says: The said drawing represented a complete car with body and running gear, as it was to be placed on the road. It had also on it a sketch of the ground-plan of the car, as I would call it, or the framework of the bottom of the car-body.

9. To the ninth interrogatory on behalf of the Complainant, he says: I last saw said drawing at a trial in Canandaigua, two years ago last summer, I think, when I was examined in a case of Ross Winans against some railroad. There was no alteration in the drawing since I first saw it. The paper was defaced from being smoked over a stove-hole. I have examined the drawing annexed to the Commission, marked "car Columbus, February, 1831," and I believe it to be a correct copy of the said original drawing of the "Columbus," except that it is not colored.

10. To the tenth interrogatory on the part of the Complainant, he says: I know that a measurement was taken by Conduce Gatch at the shop from said drawing to make the running gear by. He took it while I was at work on the body. I did my work from the paper or drawing of Winans, and he transferred the measurement from the drawing to his draft-board.

11. To the eleventh interrogatory on the part of the Complainant, he says: By the measurement or dimensions so taken from said drawing by said Conduce Gatch, he (said Gatch) constructed the running gear of the car Columbus.

12. To the twelfth interrogatory on the part of the Complainant, he says: I did work upon the body of the said car "Columbus" during its construction and until it was finished. Francis Gatch was employed with me on the said body, and we two did the whole of the wood work. John Eichelberger did the painting of the body and running gear. The running gear was made by Conduce Gatch and the men in his shop.

13. To the thirteenth interrogatory on behalf of the Complainant, he says: The said car occupied between three and four months in its construction. I would say four months. The body was first completed, and then the running gear.

14. To the fourteenth interrogatory on the part of the Complainant, he says: The running gear of said car had Winans' friction boxes, and they permitted the axles and wheels to conform, in a measure, to the curves of the road by their having a less bearing on the

end of the axle, and the friction-wheel revolving on the same (the end of the axle).

15. To the fifteenth interrogatory on the part of the Complainant, he says: The draft was applied to the trucks by a perch.

16. To the sixteenth interrogatory on the part of the Complainant, he says: After said car was put on said road for use, alterations were made in the car-body, so as to allow passengers to ascend from the inside to the top of the car, as well as outside; and there was an entire new set of running gear made, with the wheels nearer together, for the purpose of enabling the car to pass more easily round the curves. These are the only alterations I recollect, except some alterations on the bolster soon after the car was put on the road. This alteration in the bolster consisted in placing a new upper bolster and bearings, consisting of an iron wheel and plate, so as to make the car ride more steady. These bolster-alterations were made at the Mount Clare depot, and the others at the Charles-street depot.

17. To the seventeenth interrogatory on the part of the Complainant, he says: All that I know, or can say, in answer to this interrogatory, is, that while said car "Columbus" was being constructed, said Ross Winans conferred with said Conduce Gatch in reference to the construction of the running gear, and also with me in reference to the body; and with both of us, and also with Mr. Gillingham, superintendent of machinery, in regard to the alterations that were made. These conferences or instructions, for they were instructions, were given in the shops of the company when the work was going on.

18. To the eighteenth interrogatory on the part of the Complainant, he says: Said car "Columbus" was put on the Baltimore and Ohio Railroad in July, eighteen hundred and thirty-one, and then first used. It did not entirely answer the purposes for which it was intended. The difficulty was that it occasionally ran off the track, and this was obviated by the alterations afterwards made, in placing the wheels nearer together, as before stated by me.

19. To the nineteenth interrogatory on the part of the Complainant, he says: After the wheels were placed nearer together, it was safe as a passenger-car, or seemed to be so. Previous to that time it ran off the road occasionally, but no one was ever injured that I recollect of. The said car was frequently used on said road, and generally in good weather, when there was always a crowd.

20. To the twentieth interrogatory on the part of the Complainant, he says: Other cars of the plan of the Columbus were built by the company at their Charles-street depot; the first was the Winchester, of the same proportions as the Columbus, but differing in the mode of placing the trucks and in the mode of drawing. Her trucks were placed nearer to the end of the body, and she was drawn by the body instead of by the truck. Her body was made in three distinct parts, resting on a frame, and the entrance was from the side, having three entrances. The next car was called the Dromedary, and she was suspended by the top-rail. I do not remember that there was any difference between her running gear and that of the Winchester, other than that she was longer than the Winchester, and that the

trucks were placed farther apart so as to allow the body to hang down between them. The next was the Comet, which was a car representing three distinct car-bodies, and one over each truck, making five in all, and entered by doors at the side, like the two previous ones; her trucks were composed of a heavy bolster in each, resting on two large springs, connecting the wheels. The wheels were drawn as near together as they could be, to allow play. This form of the Comet was altered after a while, and the whole of the bodies were placed on a straight line. Previously three of the bodies (the middle ones) hung down between the trucks, and the end ones rested right over the trucks, and by the alteration the whole of the bodies were placed in a line over the truck. These were all the eight-wheel cars built while I was there.

21. To the twenty-first interrogatory on the part of the Complainant, he says: The Washington Branch of the Baltimore and Ohio Railroad was opened for travel in eighteen hundred and thirty-five.

22. To the twenty-second interrogatory on the part of the Complainant, he says: I was not in the employ of the said railroad during the time the Washington cars were being built, and I was out of the city. I saw said cars when they were on the road and in use, and I was once in the shop while they were building by Mr. Holmes, the contractor. They were built in the shops of the company, but not by the company, but by Mr. Holmes, who built them by contract, receiving so much for each car. I believe they were placed on the road as soon as it was ready for use. I was not there, and cannot of my own knowledge say who invented them.

23. To the twenty-third interrogatory on the part of the Complainant, he says: The Washington car differs from the Columbus in its being entered at each end in the centre with a platform extended at each end of the body, having iron bolsters and a frame-work for the body to rest upon, and all the passengers being carried in the inside. The Columbus was made to carry inside and outside. In the Washington car the draft is applied to the body entirely. These were the essential differences. The wheels in the Washington car also had the wheels placed as near together as could be, to place a break between them. I have not been in the employ of any railroad for many years, and have not sufficiently noted the difference, if any, between the Washington car and the cars used on other railroads in this country, to answer the latter branch of this interrogatory.

24. To the twenty-fourth interrogatory on the part of the Complainant, he says: For answer to this interrogatory, I refer to my answer to the twentieth preceding interrogatory. These were all the eight-wheel cars built for use before the building of the Washington car. I think the Comet was drawn by the body, and the Dromedary by the truck. They were built in the order of time of their names, and were put on the road as soon as built. They were built as experiments of the best mode of constructing eight-wheel cars. These cars were built under the immediate superintendence of Mr. George Gillingham, superintendent of machinery at that time of the company, by the plans of Mr. Winans.

25. To the twenty-fifth interrogatory on the part of the Complainant, he says: I have answered this interrogatory, so far as I can remember, in my answer to the said twentieth interrogatory, to which I refer. The alterations were made because they were thought to be improvements, or as experiments to improve. Generally I received my directions from Gillingham, who, as superintendent, was the person to give them; and sometimes Winans would come up and give them, and it was generally understood in the shops that Gillingham received his directions from Winans.

26. To the twenty-sixth interrogatory on the part of the Complainant, he says: I was not on said road when eight-wheel freight or burden-cars were first used. I speak of the eight-wheel burden-cars which have been in use on said road since eighteen hundred and thirty-five.

27. To the twenty-seventh interrogatory on the part of the Complainant, he says: Wood, stone, and merchandise were transported over said road during the years 1830, 1831, 1832, 1833, and 1834, in four-wheel cars.

28. To the twenty-eighth interrogatory on the part of the Complainant, he says: There was nothing peculiar in the arrangement used for transporting wood on said road during the said years. It was carried on the four-wheel cars, and sometimes very long timber was carried on two four-wheel trucks; but there was nothing peculiar about this, as this arrangement could be seen in the streets any day, in hauling timber on two-wagon bolsters.

29. To the twenty-ninth interrogatory on the part of the Complainant, he says: William Woodville was the master of transportation on said road prior to the year 1836, and his duties were to attend to the transportation of freight, and I believe of passengers also, and he was superintendent of the road also.

30. The thirtieth interrogatory on the part of the Complainant, he says: Ross Winans claimed the invention of said eight-wheel cars. I heard no one claim it but said Winans.

31. To thirty-first interrogatory on the part of the Complainant, he says: The invention was always attributed to said Winans, as far as I heard; he was the only one spoken of.

32. To the thirty-second interrogatory on the part of the Complainant, he says: I have always considered Ross Winans to be the inventor of the American eight-wheel car; my belief rests on the fact of my having worked on the first eight-wheel passenger-car invented by said Winans or brought to my shop by him, and because I had known or heard of such a car previous to that time.

33. To the thirty-third interrogatory on the part of the Complainant, he says: I have examined the said Letters Patent and specification, and I am of opinion that they are a sufficient guide for one skilled in mechanics or in constructing cars and carriages to enable him to construct the separate parts of an eight-wheel railroad car, suitable for the purposes mentioned in the interrogatory. I could myself build one from said patent and specification.

34. To the thirty-fourth interrogatory on the part of the Complain-

ant, he says: I think said specification does describe the eight-wheel car in general use upon railroads at this time.

35. To the thirty-fifth interrogatory on the part of the Complainant, he says: Said specification does not describe the car Columbus in every particular. In the specification the wheels are required to be placed nearer together in the truck, and to be placed nearer the end of the body, than they were in the Columbus. Iron bolsters are called for in the place of the wooden ones in the Columbus. The draft is from the perch in the Columbus, which the specification does not mention. These, I believe, are the essential differences.

36. To the thirty-sixth interrogatory on the part of the Complainant, he says: In my opinion the said specification does describe the said Washington cars.

37. To the thirty-seventh interrogatory on the part of the Complainant, he says: I was acquainted with said Conduce Gatch when he was employed on said railroad from 1830 until 1834 when I left said company. His duty was to attend to the building of cars, and he was foreman of all the shops connected with the building of cars. I worked as a journeyman in the shop for making car-bodies (the wood-work of them), and he was foreman of that shop.

38. To the thirty-eighth interrogatory on the part of the Complainant, he says: I was under no private engagements with said Gatch. I saw him every day, and we conversed together when the business of the shop required it.

39. To the thirty-ninth interrogatory on the part of the Complainant, he says: We (Gatch and I) had conversations in regard to the car Columbus while it was being built, and we both regarded it as being Winans' plan or invention, at that time. Of conversations between us of other eight-wheel cars, I have now no distinct recollection, but have no doubt we had when they were being built at the Charles-street depot, yet I cannot now remember what they were. I am unable to answer this interrogatory more particularly or fully.

40. To the fortieth interrogatory on the part of the Complainant, he says: I do not recollect any other facts in regard to the matter herein inquired of.

41. To the forty-first interrogatory on the part of the Complainant, he says: The said drawing is a correct representation of the Dromedary.

42. To the forty-second interrogatory on the part of the Complainant, he says: Yes, said drawing is a true representation of the car Comet.

43. To the forty-third interrogatory on the part of the Complainant, he says: I have looked at said drawing, marked A. It is a representation of an eight-wheel burden car. I see no difference between it and the Washington car, except in the body.

44. To the forty-fourth interrogatory on the part of the Complainant, he says: I have no knowledge of the subject-matter inquired of.

CROSS EXAMINED.

(*For Cross-interrogatories, see p. 290.*)

(45.) X 1. To the first cross-interrogatory on the part of the Defendant, he says: Conduce Gatch had charge of the shops at Mount Clare depot, where the Columbus was built.

(46.) X 2. To the second cross-interrogatory, he says: Conduce Gatch was foreman there.

(47.) X 3. To the third cross-interrogatory, he says: Francis Gatch and I worked on the body, and Conduce Gatch, Michael Glenn and Jacob Rupp worked on the running gear of the Columbus.

(48.) X 4. To the fourth cross-interrogatory, he says: Said Conduce Gatch was boss of the work, worked on it, and was there every day.

(49.) X 5. To the fifth cross-interrogatory, he says: Said Gatch was also boss over the wood-work.

(50.) X 6. To the sixth cross-interrogatory, he says: In the car Columbus the pannel was divided by a rail, while the drawing represents one pannel. The top was not finished with the netting represented on the drawing, but had short iron-standards, and a rail running through them, as a protection to the passengers riding on the top.

(51.) X 7. To the seventh cross-interrogatory, he says: I have stated positively that Winans gave Gatch directions about the running gear. Winans gave me directions about the construction of the body; and I have heard Winans and Gatch converse together about the running gear. They did this in the shop where I was at work.

(52.) X 8. To the eighth cross-interrogatory, he says: I cannot now recollect what Winans said to Gatch, but I heard them talking together about the construction of the running gear; and the drawing of the Columbus was lying on my bench at the time, and I was standing by them.

(53.) X 9. To the ninth cross-interrogatory, he says: Winans' office at this time was in Culvert-street, over the Mechanics' Bank, where the president's and chief-engineer's offices were, and Winans' employment lay in attending to the machinery about the road and shops, and improving and experimenting on machinery. His office was about three quarters of a mile from my shop.

(54.) X 10. To the tenth cross-interrogatory, he says: I do not remember of Winans making any positive declaration of his being the inventor of the running gear of the car Columbus while she was being built; but he brought the drawing of the Columbus to my shop as a drawing of his own, explained the scale to me on which it was drawn, and gave me directions to make a body like it; and thereafter, as it progressed, he visited me and gave me further directions about the construction of the body.

(55.) X 10½. To the tenth and one-half cross-interrogatory, he says: The bolsters were connected with the platform-cars by a bolt in the

centre like an ordinary wagon, and sometimes long timber was laid on the bolsters, and by its weight kept them together. I do not now recollect any other way in which the bolsters on the platform of the binder cars were connected together.

(56.) X 11. To the eleventh cross-interrogatory, he says: I do not recollect having had any conversation with Conduce Gatch about who was the inventor of the *eight-wheel truck*, or the double truck burthen cars.

OLIVER CROMWELL.

*To the Honorable the Judges of Circuit Court of the United States,
within and for the District of Massachusetts.*

I, LEVIN GALE, the Commissioner named in the annexed Commission, do hereby certify and return to the said Court: That, in pursuance of the said Commission, I proceeded on the days hereinafter named, at my office, in the city of Baltimore, in a place separate and apart from all other persons, to take the depositions of such of the witnesses named therein as were produced before me, as follows, to wit: On the twenty-fourth day of February, in the year eighteen hundred and fifty-four, Oliver Cromwell appeared before me; and the said Oliver Cromwell, having been by me first carefully examined, and cautioned, and duly sworn to testify the whole truth; and being examined on the interrogatories annexed to the Commission deposed, answered and said: —

(For Additional Interrogatories, see p. 291.)

(57.) 1. To the first interrogatory. The Winchester was first placed on the road in the latter part of 1833. The Dromedary and the Comet were first placed on the road in 1834.

(58.) 2. To the second interrogatory. I don't recollect of any such car being arranged. If it was so arranged, I had nothing to do with it.

(59.) 3. To the third interrogatory. Horses, mules, &c., were carried on four-wheel cars, previous to 1835, over the Baltimore and Ohio Railroad. I can't decribe the extent to which they were carried, now. The car was arranged with an open body, with slats around the sides, and with no top.

(60.) 4. To the fourth interrogatory. I know that the car Columbus was made from a drawing furnished by Mr. Winans. I first saw the drawing in the spring of the year 1831, in the month of March or April, I am not certain which. It was brought to the company's shop at Mount Clare, in which I worked. The drawing was drawn to a scale of three-quarters of an inch to the foot. Mr. Winans at the time informed me of the scale upon which it was drawn.

(61.) 5. To the fifth interrogatory. It exhibited the body and the running gear of a car.

(62.) 6. To the sixth interrogatory. The drawing was not used afterwards. It remained in my possession until 1839.

(63.) 7. To the seventh interrogatory. This question, I suppose, has reference to the use I made of it. I folded it up, and the only use I made of it was to nail it up over a stove-hole; it remained there until I was called upon by Mr. Winans, in 1839, to know what had become of the drawing. I had nailed it up some time previous, as I have stated, over a stove-hole in my dwelling-house. When Mr. Winans called on me to know whether I had it or not, I told him I would look for it, as I did not know then whether I had it or not. I looked for it, and found it nailed up over a stove-hole in my dwelling-house. A suit was then pending in Baltimore, between Mr. Winans and the Newcastle and Frenchtown Railroad; and he had me summoned as a witness, and I carried the drawing with me down to court. At this time, I was in the employment of James McCurley, a coach-maker, in Liberty-street.

(64.) 8. To the eighth interrogatory. It was smoked.

(65.) 9. To the ninth interrogatory. It is the original drawing of the car Columbus, the same one that I worked by, and afterwards nailed over a stove-hole.

(66.) 10. To the tenth interrogatory. There is no difference in the lines from what it was when I first saw it.

(67.) 11. To the eleventh interrogatory. All I can say about the matter is, that the car, which was made from the drawing shown to me, was intended to test whether a car could be made to carry passengers with advantage, having eight wheels.

[Adjourned until the 25th day of February, 1854.]

On the 25th day of February, 1854, the said Oliver Cromwell again appeared before me, and, being examined on the cross-interrogatories annexed to the Commission, further deposed, answered and said:—

(*For Cross-interrogatories, see p. 292.*)

(68.) X 1. To the first cross-interrogatory. In 1830 there were two wood-work shops, and one blacksmiths' shop; there was no regular painting-shop. The painting was done in the car-house, that which was not done out of doors; a great deal of it was done out of doors. I speak now of the Mount Clare Depot. Mr. Leonard Forrest had charge of the blacksmiths' shop. Mr. Conduce Gatch had charge of the shop where the trucks were made. I had charge of the shop adjoining Mr. Gatch, which was used for the purpose of repairing and doing the body-work of the cars. This state of things continued until I quit the service of the company, in October, 1831. When I returned to the service of the company, in June, 1832, the new work of the company was done at the Charles-street shops, under the superintendence of Mr. Gatch, who occupied the first and second stories. I then took the third story; and things continued in that way until

1834, when I left. Mr. Gatch left the service of the company a short time previous to my doing so.

(69.) X 2. To the second cross-interrogatory. In addition to Gatch, there was in his shop, Jacob Rupp, Michael M. Glenn, Washington O. Frost, Francis A. Gatch, Charles Baker, Reubin Aler. John Eichelberger was the painter. Leonard Forrest was the blacksmith. That was all, except myself. These all worked there in 1830 and 1831. From 1832 to 1834 there was Jacob Rupp, Michael M. Glenn, Washington O. Frost, Francis A. Gatch, John Eichelberger, and Leonard Forrest; that is, during a portion of the time; some of them remained to the end of that period. There were a great number of men employed in the shops, between 1832 and 1834, whose names I do not recollect. I now recollect that Henry Reynolds also worked at the Mount Clare shops, for a short time. Henry Schultz worked at the Charles-street Depot; and a Mr. May, Mr. Cole, Mr. Buckingham, Mr. Bennett, and a number of others, whose names I have forgotten. I now recollect Lloyd Claudge, coach-painter, and George Bartol, and Mr. Dempsy, and a man by the name of Prettyman; that, I think, is about all that I can recollect. There were others that worked there.

(70.) X 3. To the third cross-interrogatory. I became acquainted with George Gillingham while I was at work at the Mount Clare Depot, when I returned to Baltimore, in 1832; Mr. Gillingham was then superintendent of machinery for the Baltimore and Ohio Railroad Company, and he employed me to go to work in the service of the company. His duties were to give a general superintendence to the machinery, and to the construction of cars. I know that fact from his being about the place every day, and from having frequently received directions from him myself, with regard to my work. He continued there until 1834, when I left the service of the company.

(71.) X 4. To the fourth cross-interrogatory. I know that he was the chief engineer; but how long he continued to be chief engineer, I cannot state. He was chief engineer whilst I worked at the Mount Clare Depot. I have no personal knowledge of his duties, further than that I understood he had the general superintendence of the laying-out and construction of the railroad.

(72.) X 5. To the fifth cross-interrogatory. What I have stated is from my own knowledge so far.

(73.) X 6. To the sixth cross-interrogatory. I can't state the rate of speed at which they ran. It was seldom that I was on the road. I worked in the shops.

(74.) X 7. To the seventh cross-interrogatory. I did not see it made; but I was told by Mr. George Brown, that Mr. Winans was making a drawing for an eight-wheel car, and that he wanted me to make the body; and, in a short time afterwards, Mr. Winans brought the drawing out to me, and left it at the shop, and I made the body by it. I can't state the day of the month when he brought the drawing to me, but it was in the spring of the year 1831.

(75.) X 8. To the eighth cross-interrogatory. Ross Winans did not superintend the shops. His attention was chiefly directed to making

improvements in the cars, and trying them. He was frequently at the shop where I was at work, while the Columbus was building.

(76.) X 9. To the ninth cross-interrogatory. All that I know about Ross Winans giving directions about the Columbus, was what I received myself, and heard him give to Conduce Gatch, on one or two occasions, in the shop where I was at work. I can't state now what he said to Conduce Gatch, but it was in reference to the construction of the carriage-parts or running-gear of the Columbus. Francis A. Gatch and myself worked upon the body, and Michael M. Glenn, Jacob Rupp, and Washington O. Frost worked on the trucks. John Eichelberger painted the car. Leonard Forrest did the iron-work.

(77.) X 10. To the tenth cross-interrogatory. The car was built very nearly as is represented in the drawing shown to me by the Commissioner, marked "Oliver Cromwell, No. 1" (not "Columbus," as is mentioned in the interrogatory). There were some slight differences. There was one more rail put in on the side of the body, running lengthwise, so as to show two rows of panels, instead of one, as is represented in the drawing; and the perch stopped in the centre of the truck, I think, instead of running to the end of the truck, as represented in the drawing. The net-work on the top of the car was left off. In other respects the car and drawing are alike.

(78.) X 11. To the eleventh cross-interrogatory. The last time I saw it, the body was sitting down on the ground, at the Mount Clare Depot, and was used at that time to put iron in. This was after it was taken off the road, and was, I think, some three or four years after I quit the service of the company, in 1834. I understood she was subsequently broken up.

(79.) X 12. To the twelfth cross-interrogatory. Three-quarters of an inch to the foot.

(80.) X 13. To the thirteenth cross-interrogatory. I know the length of the body; it was twenty-four feet long, seven feet wide, and seven feet high. I can't give the size of the wheels, as I had nothing to do with them; they were of the same size of the ordinary wheels on the road; nor can I, from my recollection, say what was their distance apart in the trucks. I know the bearing was six feet from each end of the car, and the centre of each truck was six feet from the end of the body. Mr. Gatch made the truck-frames. I do not know any thing about their size. The car had no springs. There was a brace across the truck over the centre, when she was built; but it was soon afterwards taken out. The upper bolster rested on the leather brace; but, when the brace was removed, the bolster was placed on in a manner similar to that now in use. There was, I think, a new bolster put under, with an iron plate in circular form, in the centre, and a small iron roller placed on the lower bolster near the outer end. There was no side-bearing when she was first constructed. She had friction-wheels and boxes on when built. She was drawn by horse-power.

(81.) X 14. To the fourteenth cross-interrogatory. The Winchester was twenty-four feet in length. I don't recollect the width or length.

It was high enough for a man to stand up in ; but what its exact height was, I cannot state. The wheels were of the same size as the ordinary wheels then in use ; but I cannot give their exact size, nor can I give the distance between the wheels in the trucks. This car had three bodies ; the bolsters were just about the centre of each end body. The distance from the centre of the truck to the end of the body was about four feet. I can't give the length of the truck-frame, I had nothing to do with them. This car had no braces. I can't state with certainty the size, shape, or exact position of the springs. The wheel-frames were of the ordinary kind in use. I think it had side-bearings. It had plain boxes. It was drawn by the frame on which the body rested, the framing of the body.

The Comet: I do not recollect the particulars as to this car, or as to the Dromedary. I can't state the size of the bodies of either of them. The Dromedary was suspended by the top, and the wheels were placed very near together in the trucks. The trucks were placed as near to the ends of the body, and beyond, as they could be. I can't say how far the centres of the truck were from the end of the body, but the trucks were placed as near to the end of the body as they could be placed. I don't know the length of the truck-frame. The bolsters were placed on in the usual way, resting on a pivot, with side-bearings. I can't say any thing about the springs, more than they were stout, heavy springs, with little curve, nearly straight. I don't know that there was any thing different in the construction of the wheel-frames from the common frames ; that is, the wheel-frames under eight-wheel passenger-cars. The Winchester had plain boxes on her wheels, the friction-wheels and boxes having been dispensed with some time previous.

The Comet was a long car, representing five bodies. I can't give the length, width, or height, in feet and inches. She had the ordinary size wheels, drawn very near together, nearer than any cars previously ; as near together as they could be got and allowed to play. The trucks were very near the ends of the body ; I can't give the distance from the ends of the body. I don't recollect the length of the truck-frame. There was a stout spring on each side of the truck, and the bolsters rested upon the springs. Each end of the spring was made fast to the box over the centre of the bearing of the axle. That was all the frame for the wheels. The draft was from the body. I think it had side-bearings. It had plain boxes.

I was not in the employment of the company when the Washington cars were built, and have no particular knowledge with reference to their construction. I have seen them, and know that they were long eight-wheel cars, drawn by the body ; and that they appeared to be convenient and comfortable cars, as far as I could judge.

(82.) X 15. To the fifteenth cross-interrogatory. I received instructions from Mr. Winans and Mr. Gillingham, whilst I was at work on the Winchester, Dromedary, and Comet, relative to the manner of building them. There was a pencil-drawing of the Comet ; I am not certain whether it was brought to the shop by Mr. Winans or by Mr. Gillingham. I did not see the drawing made. I do not know of my

own personal knowledge who made said drawing. I don't recollect of having any plan or drawing of the Winchester or the Dromedary. I made a working-draft for the body of the Winchester myself. I have no copy of the drawing of the Comet, furnished to me, or of the drawing of the Winchester, made by myself, to annex to my deposition. Directions were given to me about the manner of building the bodies of the three cars named, by Ross Winans. Said directions were given to me at the shop of the company, whilst I was engaged in building said cars, and in preparing to build them. I can't give either the language he used, or its substance. I recollect that he suggested to me the propriety of going to Amboy, to see the cars there, before commencing the Winchester. I went on there to see them, as he wished to adopt the coach-body style, which was used at Amboy.

(83.) X 16. To the sixteenth cross-interrogatory. I had no connection with the building of the Washington cars, as I was not in the employ of the company at the time they were built.

(84.) X 17. To the seventeenth cross-interrogatory. Mr. Conduce Gatch had superintendence of the shops, bought material, and paid the hands off; and I know nothing further about his duties.

(85.) X 18. To the eighteenth cross-interrogatory. I do.

(86.) X 19. The original design of the Columbus was not made in my presence. I know that said design was actually followed in building the Columbus, by the workmen employed to build her; because the drawing was placed in my possession, and the body was built by me, and I followed the drawing in building the body. The drawing remained about the shops the whole time the car was being built, and until I left the road, in October, 1831, when I took it away in my chest of tools.

(87.) X 20. To the twentieth cross-interrogatory. I have already stated that I was not in the employment of the company when the Washington cars were built, and had nothing to do with their construction.

(88.) X 21. To the twenty-first cross-interrogatory. All of the cars named were put into use as soon as completed, and were used for the transportation of passengers on the said railroad, publicly. The Columbus was put into use about the first of July, 1831. The Winchester was used first, I think, in the latter part of 1833. The Dromedary and the Comet were put into use sometime in 1836, previous to October, or the latter part of September, when I left the company. The Columbus was in use, and so were all the others, when I left the service of the company. As far as I know, they were used on said road with the knowledge, consent, and approbation of Ross Winans. I don't know how long they were used after I left the road.

(89.) X 22. To the twenty-second cross-interrogatory. I am not in the employment of Ross Winans, or of any person interested in the patent for eight-wheel cars; nor have I ever been. I have not any interest in this suit, or in the said patent; nor have I ever had. I am acquainted with some of the witnesses, and have conversed with them. I don't know of any of the witnesses being in his employ, or in the manufactory in which he is interested. I am not acquainted with any person who works in his establishment.

(90.) X 23. To the twenty-third cross-interrogatory. I have no knowledge of the matter inquired of in this interrogatory, as I understand it to refer to the Washington cars, which were built after I left the road.

(91.) X 24. To the twenty-fourth cross-interrogatory. I answer as same as to the previous interrogatory.

(92.) X 25. [Omitted in the interrogatories sent.]

(93.) X 26. To the twenty-sixth cross-interrogatory. I know nothing of the matter inquired of in this interrogatory. I am not engaged in railroad-work at all.

(94.) X 27. To the twenty-seventh cross-interrogatory. I had neither seen, heard, or heard read, the interrogatories in this cause, before they were put to me by the Commissioner, nor was the substance of them communicated to me before.

I have had no conversation with Mr. Winans. Mr. Gould called me and told me he wanted me to give my deposition, and to state, as near as I could, what I recollected about the building of eight-wheel cars. That was about the substance of all that passed between him and myself.

I have seen a pamphlet containing the evidence of witnesses on a former trial, and I read a small portion of it.

I am acquainted with several of the witnesses; but there are none of them, that I know of, that are in the employment of Winans, or of any of his sons, nor connected with him or them in business.

(95.) X 28. To the twenty-eighth interrogatory. I have not stated any thing except what I have personal knowledge of.

(For Special Cross-interrogatories, see p. 297.)

(96.) X 1. To the first special cross-interrogatory. I have been examined before; once in the Court, here in Baltimore, in the case against the Newcastle and Frenchtown Railroad Company; once in Canandagua, New York; and twice before a Commissioner in this city.

(97.) X 2. To the second special cross-interrogatory. I have given my testimony twice before a Commissioner, in relation to this matter; but I don't recollect who the parties were. In one of the cases, it was some railroad company.

(98.) X 3. To the third special cross-interrogatory. Yes, I did.

(99.) X 4. To the fourth special cross-interrogatory. I first saw it at the shop, in the hands of Ross Winans; he brought it to me to work by. It was not then smoked. It was painted then just as it is now. It was not covered at the time I received it. I covered it myself, after I took it from the stove-hole. It has no cloth on the back of it. I pasted a piece of paper on the back, to give it a more decent appearance. I am very certain that there has been no alteration in it. My attention was particularly called to the plan at that time, because it was the first car of the kind that I knew any thing about. I can't state of my own knowledge who made the drawing. There have been no alterations made upon the drawing.

(*For Special Cross-interrogatories, see p. 298.*)

(100.) X 1. To the first special cross-interrogatory. I can't state positively whether it was in the latter part of September, or in October, 1831; but I think it was in October.

(101.) X 2. To the second special cross-interrogatory. I think there was an alteration of that kind made.

(102.) X 3. To the third special cross-interrogatory. I can't state whether there were any alterations made at that time, but they were altered afterwards.

(103.) X 4. To the fourth special cross-interrogatory. Yes.

(104.) X 5. To the fifth special cross-interrogatory. I don't think I ever made any such statement.

[Adjourned to the 26th day of February, 1854.]

On the 26th day of February, 1854, the said Oliver Cromwell again appeared before me, and further deposed, answered, and said:—

(*For Additional Interrogatories, see p. 298.*)

(105.) 1. To the first additional interrogatory. I saw those kinds of cars in use on the Baltimore and Ohio Railroad, while I was at work at Mount Clare. I can't state to what extent they were used.

(106.) 2. To the second additional interrogatory. I think it was somewhere about 1834 or 1835.

(107.) 3. To the third additional interrogatory. He was in the service of the Baltimore and Ohio Railroad Company when I went there. He was master-carpenter, and superintended the shops in which the cars were built.

(108.) 4. To the fourth additional interrogatory. I do not know of his ever having had such authority.

(109.) 5. To the fifth additional interrogatory. I don't know that I can add any thing.

(*For Additional Cross-interrogatories, see p. 299.*)

(110.) X 1. To the first additional cross-interrogatory. No, I don't mean to include such temporary cars; they were not eight-wheel cars. I saw long timber laid on two ordinary four-wheel cars, and carried in that way, before the Columbus was put on the road.

(111.) X 2. To the second additional cross-interrogatory. It is from my own personal knowledge.

(112.) X 3. To the third additional cross-interrogatory. I have no knowledge of the day he entered the service of the company, or the circumstances that attended it. At that time I was unacquainted with him.

(113.) X 4. To the fourth additional cross-interrogatories. I don't know any thing of the by-laws or regulations of the company, by which he was regulated.

(114.) X 5. To the fifth additional cross-interrogatory. It was his business to obey the officers of the company; but under whose special charge he was, I cannot say.

(115.) X 6. To the sixth additional cross-interrogatory. He did.

(116.) X 7. To the seventh additional cross-interrogatory. The shop I worked in at Mount Clare was adjoining to the one he worked in. I worked there from the spring of 1830 to the fall of 1831.

(117.) X 8. To the eighth additional cross-interrogatory. I have known Conduce Gatch to receive instructions from Mr. George Brown, in regard to the building of the cars. Have frequently seen Mr. Brown in conversation with Mr. Gatch. Mr. Brown was at the shops nearly every day, was a very active member of the company, and seemed to take great interest in its affairs.

(118.) X 9. To the ninth additional cross-interrogatory. During most of the time, I have resided in Baltimore, and I now reside in Baltimore. From the fall of 1831 to the spring of 1832, at work at coach-making. From the fall of 1832 to the spring of 1835, I was in Lowell, Massachusetts, at work at car-building. From January, 1836, to October of the same year, I was at Mobile, at work at coach-making. From the spring of 1837, to July of the same year, I was in the State of Georgia, at work at car-building. A small portion of my time I was at work in Washington, coach-building. All the rest of the time I have lived in Baltimore, and have been engaged the greater part of the time in coach-making; a portion of the time I have been engaged in car-building. I am now at work at coach-making, and have been, constantly, for the last seven or eight years.

(119.) X 10. To the tenth additional cross-interrogatory. I never was in the employ of either of them, or of any firm in which they were, to my knowledge, interested.

(120.) X 11. To the eleventh additional cross-interrogatory. I went to see Mr. Forrest and Mr. Rupp, with Mr. Charles D. Gould. I went for the purpose of showing Mr. Gould where Mr. Forrest lived. I called to see Rupp, at Mr. Gould's request, to tell him that Mr. Gould wanted to see him, and would call at his house that night, about seven, if convenient; and I then called in the evening, and saw Mr. Rupp with Mr. Gould. This was, I think, two years ago last summer. These were the only occasions and the only witnesses I ever went to see, at the request of Mr. Gould, or with him, or on this subject. I never went to see any with Mr. Winans, or at his request.

(121.) X 12. To the twelfth additional cross-interrogatory. I am employed, and have been for the last four years, by William McCain, coach-maker, as a coach-body maker.

(122.) X 13. To the thirteenth additional cross-interrogatory. I have not seen Mr. Winans for the last five or six months. I had a slight conversation with him on the subject of the building of the Columbus, some two or three years ago; and also had some conversation with him on the same subject, about the time of the trial of the case against the Newcastle and Frenchtown Railroad, in 1839.

I have stated to Mr. Gould what I have stated in my deposition.

I have had some three or four conversations on the subject with him; the last of them took place some five or six weeks ago.

I have at various times stated the same things, concerning the building of the Columbus, to other persons; among whom, I remember conversing with James McCurley, during the trial of the first case, in 1839, and various other persons whom I do not recollect.

(123.) X 14. To the fourteenth additional cross-interrogatory. I have not, and never had.

(124.) X 15. To the fifteenth additional cross-interrogatory. No, I never assisted in any thing of the kind.

(125.) X 16. To the sixteenth additional cross-interrogatory. I have already answered the question as far as I can. She was on the road when I left it, in 1834. Some years afterwards, saw the body on the ground, used as place to put iron in. She was, I believe, finally broken up.

(126.) X 17. To the seventeenth additional cross-interrogatory. I can't answer. I don't recollect that I ever saw her run with locomotive at all. The cars were all taken from the Charles-street Depot, when I worked from 1832 to 1834, by horses.

(127.) X 18. To the eighteenth additional cross-interrogatory. Upon the inside.

(128.) X 19. To the nineteenth additional cross-interrogatory. The flanges of the wheels were all fixed to run upon the inside of the rail, when I first went into the service of the company, and they have been so fixed ever since. I understood that previously, at one time, they had been fixed to run upon the outside; but of this I had no personal knowledge.

OLIVER CROMWELL.

Subscribed before

LEVIN GALE, *Commissioner*.

CIRCUIT COURT OF THE UNITED STATES, }
 FOR THE FIRST CIRCUIT. — October Term, 1852. }

DISTRICT OF MASSACHUSETTS.

ROSS WINANS *vs.* THE EASTERN RAILROAD COMPANY,

IN EQUITY.

Cross-interrogatories to Michael L. Glenn, of Easter Neck Island, Kent County, Maryland, on behalf of the Defendant.

X 1. Was not the yellow-painted drawing of the car-body (mentioned by you in answer to the sixth direct interrogatory), when you first saw the same, lying on Cromwell's bench?

X 2. Did you see it brought there?

X 3. Was the car Columbus drawn by horses? How was the Winchester, Dromedary, or Comet drawn?

X 4. When the car Columbus ran to Ellicott's Mills, July 4th, 1831, was any other car attached to her?

X 5. Will you describe how the platforms (used before the car Columbus was built), for the transportation of wood upon the railroad, were constructed? Were eight wheels used under each car? or, in other words, were there double trucks? and in what respects they differed from the timber-cars? How were the long timbers connected with the bolsters? By what means were they fastened, if any?

X 6. Did you ever (before the car Columbus was built) see two four-wheeled platform burthen-cars, used for drawing long sticks of timber, having a bolster on each of the platform-cars, and timbers going from one bolster to the other, so as to enable the truck to swivel and conform to the curves of the road, and to the switches? If yea, will you state when, where, and how many of them were used?

X 7. Will you state how the king-bolt operated in these timber-cars, if any? How the bolsters were made and operated? How the trucks operated; and how far apart was the bearing points of the wheels; and how were the axis of the wheels kept in place?

X 8. Are you sure how the bolsters were rigged upon the wood-cars, that is, upon the eight-wheel wood-cars? And how the wood was kept from being hustled off while the cars were running?

X 9. Are you sure that the *timber-cars* and the wood-cars with eight wheels each, were constructed in the same manner? If they were not, will you describe the difference, and state which of them, if either, had the timbers (that connected the two trucks or short cars together) bolted or fastened to the bolsters that rested on each of the short cars, so as to enable the truck to swivel without rattling off the wood that was piled upon the platform?

X 10. When you were working upon the trucks of the Columbus, did you have before you the drawing mentioned in your sixth interrogatory?

X 11. Did you receive directions from Mr. *Conduce Gatch* to go on, and make the trucks for the car Columbus?

X 12. Did you receive directions from Mr. *Conduce Gatch* how to do the work?

X 13. Did Mr. *Conduce Gatch* produce a drawing (on a board) of the *running gear* of said car?

X 14. Did Mr. *Conduce Gatch* make that drawing? Did you see him make it?

X 15. Where, when, and in whose presence, was it made?

X 16. Did Mr. Winans see the drawing of the running gear of the car Columbus, which said Gatch had made on the board?

X 17. How many and which of the cars named in your answers were drawn by the perch; and which, if either, was drawn by the body?

X 18. Was the car Columbus made according to the drawing mentioned by you, in your answer to the sixth direct interrogatory; or was it not so made?

X 19. Was the running gear of said car made according to said

Gatch's drawing on the board, and to his directions? If not, wherein did you vary from his drawing on said board, and wherein did you not mind his orders and directions?

X 20. What was your duty or business as superintendent of cars?

X 21. Did you work on the Comet?

X 22. Did you sufficiently examine the Washington cars, to enable you to state all the difference between them and the Comet? If so, please state all the difference.

X 23. Will you state wherein the Washington cars differed from the Columbus, and from each of the other cars mentioned in your preceding answer?

X 24. Have you ever received any letter from said Winans, relating to his alleged invention or his patent, or to gain testimony in any case in which he is or has been interested? If yea, how many?

X 25. Have you held conversations, or been talked with by any person, in relation to your knowledge of the subject? If yea, will you state the names of these persons, when and how many times you have had conversation of this description?

X 26. Have you ever seen any other drawings besides the ones attached to this deposition, *purporting* to be copies of the alleged original drawing, mentioned by you in your answer to the 6th direct interrogatory? Have you been told that such drawings *were* true copies of said alleged original drawing? If so, by whom were such drawings shown to you? and when did you first see such drawings?

X 27. When did you first communicate to said Winans, or to any other person, what you knew in regard to the drawing mentioned in the sixth direct interrogatory? Where were you? Who was present?

X 28. Where, and when, and in whose possession was said drawing when you first saw it, after you left Baltimore, in 1840 or 1841?

X 29. After the car Columbus was built, what came of the said drawing, so far as you know of your own knowledge? When, where, and in whose possession, did you see it, next after the car Columbus was finished?

X 30. What came of *Mr. Conduce Gatch's* drawing of the running gear, made upon the board?

X 31. Have you been called upon to testify and to make affidavits in favor of Mr. Winans or those in his interest? If so, when, where, and how many times? And what compensation have you received from any person, and what has been promised to you?

X 31½. In whose employ are you now, and in whose employ have you been since 1840; and what is your occupation?

WILLIAM WHITING, *Counsel for Respondent.*

The foregoing are true copies of the original interrogatories on file.

Attest,

H. W. FULLER, *Clerk.*

Deposition taken the 18th, 19th, 20th, and 21st days of January, 1854, as follows :—

MICHAEL M. GLENN, a witness named in said Commission, being duly sworn and carefully examined on the interrogatories and cross-interrogatories addressed and propounded to him, and annexed to said Commission, and being examined on behalf of Complainant in the said cause, deposes and says as follows :—

(For Interrogatories, see p. 286.)

1. To the first interrogatory on the part of the Complainant, he says : My name is Michael M. Glenn ; I am fifty years of age ; am a house-carpenter ; and I reside on Easter Neck Island, Kent County, Maryland. I have been a carpenter since I was sixteen years of age, part of the time on the Eastern Shore of Maryland, and part of my time in the city of Baltimore.

2. To the second interrogatory, he says : I know said Ross Winans, and am well acquainted with him. I first became acquainted with him at the Mount Clare Depot of the Baltimore and Ohio Railroad Company, when he entered into the employ or service of the said Company, in the year 1830, I think ; but it may have been in 1829. It was, however, directly after he had arrived from England. His duties were to get up the machinery, to make improvements in the cars and machinery.

3. To the third interrogatory, he says : I knew him there certainly up to 1837, and I think he was there longer. My duties, up to 1834, were in the shops of the company, as a carpenter, making and repairing cars. During the year 1834, Conduce Gatch left, and I was appointed superintendent, or boss of the shops, in his place ; and this place I held until I left in 1839. I had a general superintendence of the work-shops under George Gillingham, Jonathan Jessup, William S. Woodside, and James Murray.

4. To the fourth interrogatory, he says : Ross Winans, during the time he was there, as before stated, was employed in the departments for the construction of machinery, that is to say, his department or duty was to improve and invent cars and machinery. I saw him about the shops almost every day, giving instructions how to go on with the work, when they got at a loss for any thing.

5. To the fifth interrogatory, he says : The Columbus was the first eight-wheel railroad-car I ever knew, and this car was constructed at the shops of the said railroad company at Mount Clare Depot, in the year eighteen hundred and thirty-one. Ross Winans was the author, and he first brought a drawing of it out to the shops. It was built for a passenger-car, by the hands of the company at their shops, under the directions of said Winans, and from his said drawing. I, myself, worked on the running gear.

6. To the sixth interrogatory, he says : As stated in my previous answer, I did see a drawing of said car Columbus at the work-shop

of said company. The first time I saw it was on Oliver Cromwell's bench. I had heard from Mr. George Brown, in a conversation between him and Winans, that there was such a drawing; and when it was brought out and left in Cromwell's shops, Cromwell called me to look at it, as something new. I went into Cromwell's shop, and examined the drawing. Winans and Brown were in said shop during said day. This was in the beginning of the year eighteen hundred and thirty-one; said drawing remained in Cromwell's shop until long after the car was built from it.

7. To the seventh interrogatory, he says: Cromwell showed me said drawing before the said car was commenced; and I saw it in his shop, or the adjoining one, where I worked on the running gear, during the whole time the Columbus was being built from it. I cannot say positively by whom said drawing was made; but no one doubted that it was made by Ross Winans. This was admitted by every one connected with the company at the time.

8. To the eighth interrogatory, he says: The drawing was, when I first saw it, complete, and represented a car with body and running gear such as the Columbus, when built.

9. To the ninth interrogatory, he says: I last saw the said drawing in the Commissioner's office, since this question was put to me. It has not been in any way altered since I first saw it; it is somewhat defaced or soiled by use, and smoke or fire, but in no way changed. The drawing hereto annexed, marked "Car Columbus, February, 1831," now shown me by the Commissioner, is a copy of the said original drawing of the Columbus.

10. To the tenth interrogatory, he says: I was engaged on the truck or running gear of the said car Columbus, with Jacob Rupp and Washington O. Frost, in the construction of the said running gear; and, while we were preparing to work on it, Conduce Gatch, who was the boss of our shops, said to us, "Well, boys, this is a difficult job, any how; and as Cromwell cannot spare the drawing, I will go and get it, and make a copy of the running gear on my draft-board." Gatch went into Cromwell's shop, brought the drawing into our shop, and there took upon his draft-board an exact copy of the running gear, from which copy we afterwards worked. This was before we began to work on it. It is the only copy I know of.

11. To the eleventh interrogatory, he says: We, Jacob Rupp, Washington O. Frost, and myself, constructed the running gear of the car Columbus, from said copy so made by Conduce Gatch of it, from the drawing in Cromwell's room.

12. To the twelfth interrogatory, he says: I did work on said car Columbus during its construction, and upon the running gear, as I have already stated. The body was built by Oliver Cromwell and Francis Gatch, and the running gear by myself, and Rupp, and Frost; sometimes one of us worked on part of the running gear, and sometimes another. We did not work constantly on it, for there was no occasion, as it took so much longer to make the body than the truck; we worked on it, left it when called on to do more urgent work, and returned to it again, until it was completed.

13. To the thirteenth interrogatory, he says: The said car was put on the road in July, 1831; but I cannot recollect precisely how long it was in the course of construction, but some three months or three months and a half, I should think. I think the truck was first completed, and I am quite sure of this.

14. To the fourteenth interrogatory, he says: The said running gear of said car had friction-boxes, just as they are on the drawing, to adapt it to the curvatures of the road. Inside of the large box, as shown on the drawing of the wheel, was placed a friction-wheel, and the end of the axle bore against that friction-wheel, which revolved in the inside of the larger box. The friction-wheel had a journal to support the weight of the car; and this journal was permanent in the friction-wheel, and had bearings to revolve in. This portion of the running gear I worked on myself.

15. To the fifteenth interrogatory, he says: The draft of said car Columbus was applied to the truck.

16. To the sixteenth interrogatory, he says: After said car was put on the said road for use, there were new side-pieces to the truck put on, and different boxes; they were plain chill-boxes; and this was done, because when the winter came on, they found that the friction-wheels stopt revolving in consequence of water getting in and freezing. Different axles were on her, having rings to bring up the oil in the box to feed the journal. The steps leading to the top were changed from the outer to the inside of the car, and an awning was put on top. I do not at this moment recollect any other alterations.

17. To the seventeenth interrogatory, he says: Winans was there all the time, that is, almost every day, giving us instructions about the construction of the said car, and also about the alterations.

18. To the eighteenth interrogatory, he says: Said car Columbus was first put in use on the fourth of July, 1831, on the Baltimore and Ohio Railroad, and ran from Baltimore to Ellicott's Mills. It did not give satisfaction because it ran off the track. I know of no other reason.

19. To the nineteenth interrogatory, he says: The said car could not be said to be safe, because she would sometimes run off the track round short curves; otherwise she was perfectly safe, and she was pretty constant in use on the road.

20. To the twentieth interrogatory, he says: There were three other cars built on the said road; the Winchester, Dromedary, and Comet. They were all eight-wheel cars, but different in the form and construction of the bodies from the Columbus. The Winchester was drawn by the body, and the other two by the perch, I think.

21. To the twenty-first interrogatory, he says: The Washington branch of said road was, in 1835, opened for travel.

22. To the twenty-second interrogatory, he says: Cars, called the Washington cars, were built at the shops of said company, and used on the Washington branch of said road as soon as it was opened, in 1835. They were built under the direction of Ross Winans, as I always understood. I recollect when said cars were in the course of construction; and said Winans was pretty much about the shops every day, overlooking their construction.

23. To the twenty-third interrogatory, he says: The Washington car differed from the Columbus in having a longer body, which was wider than the truck; the body being fastened on to a frame that dropped down on the side of the truck, as can be seen at the present day. The wheels were brought closer together than in the Columbus, and iron bolsters were substituted for wooden ones. The top bolster was of the same length as the width of the car, and the bottom bolster was about five or six inches wider than the truck, to permit a roller on the end of the bolster to make it vibrate easy, with a plate on the top bolster immediately over the roller. The sides of the trucks were plated with iron, with iron cross-pieces and a heavy nut on the end, going through the side-piece so that it could be kept in place by tightening it when required. The frame in which the body rested, extended about four feet beyond each end of the body, which formed a platform to which the draft was applied; and the interior of the car was arranged with a passage through the centre, with a door at each end to enter from the platforms. These were differences between the Washington car and the Columbus. The only difference, I recollect, between said Washington car and the American car, now in use, is that they dispense with the frame on which the body rested.

24. To the twenty-fourth interrogatory, he says: I have already stated in my answer to the twentieth interrogatory, the three cars built for use on said road before the building of the Washington cars, and their names, and how drawn. The difference from each other I cannot now state more particularly, nor can I more fully answer this interrogatory than I have done. They were built under Ross Winans' directions; and he, I always believed and understood, furnished the plans for them.

25. To the twenty-fifth interrogatory, he says: I remember that in one of them, the Dromedary, I think, three of the bodies hung down between the wheels, and it was afterwards placed on a straight line. I do not now remember any other alterations. Whatever alterations were made, were made under Ross Winans' direction, as I always understood.

26. To the twenty-sixth interrogatory, he says: In the latter part of 1834, or beginning of 1835, some eight-wheel freight-cars were built at the shops of said railroad company; but when first used I cannot now state.

27. To the twenty-seventh interrogatory, he says: Wood, stone, and other merchandise, were transported over said road, during the years 1830, 1831, 1832, 1833, and 1834, on four-wheel cars. The wood was brought on a four-wheel car, having two pieces of scantling twelve feet between the standards, which were four feet four inches high, with chains at the tops of the standards to connect and keep them together, and the wood from falling off; and the car, thus arranged, carried one cord and a half of wood.

29. To the twenty-ninth interrogatory, he says: William Woodville was the master of transportation on said road prior to 1836. His duty was to superintend the transportation or forwarding of the goods, merchandise, &c., on the road.

30. To the thirtieth interrogatory, he says: Ross Winans claimed the invention of the said eight-wheel cars, which were put on said road prior to 1835. I have never heard any one else claim it.

31. To the thirty-first interrogatory, he says: No one but said Winans was spoken of, or commonly known, as the inventor of the said eight-wheel car, including the Washington car.

32. To the thirty-second interrogatory, he says: I believe Ross Winans to be the inventor of the American eight-wheel car, because he planned the first eight-wheel cars used on any railroad that I know of.

33. To the thirty-third interrogatory, he says: I have read the said patent and specification, and I am of opinion that they are a sufficient guide for one skilled in mechanics, or in constructing cars and carriages, to enable him to construct the separate parts of an eight-wheel railroad car for passengers and merchandise on railways, at the usual rates of speed.

34. To the thirty-fourth interrogatory, he says: Yes: said specification does describe the eight-wheel car in general use upon railroads at this time.

35. To the thirty-fifth interrogatory, he says: That said specification does not describe the Columbus. The difference is, that one is drawn by the body and the other not, and the wheels are closer together in the specification than in the Columbus. In the Columbus, the trucks or bearing-carriages are nearer together than those described in the specification. These are the especial differences.

36. To the thirty-sixth interrogatory, he says: I think that said specification does describe the Washington cars.

37. To the thirty-seventh interrogatory, he says: I was acquainted with said Conduce Gatch from the time I went on the said road until he left in 1834. He was superintendent of the wood-work for cars built at the shops of the company, and I was employed under him.

38. To the thirty-eighth interrogatory, he says: I was under no private engagement with said Gatch; we worked together on the same work and in the same shop, and I was constantly in his company.

39. To the thirty-ninth interrogatory, he says: I always understood said Conduce Gatch to regard the car Columbus, and the eight-wheel car now in use, as the invention of Ross Winans. I always understood from Gatch that said Winans had brought the drawing of the Columbus to the shop, and given it to Cromwell. While we were at work on the Columbus, said Gatch always said it was Winans' invention. And I remember that when we were constructing the bolsters of the Columbus, we (the journeymen in the shop) were at a loss about the camel, as we termed it; and we applied to Gatch, who said that it was best to wait until Winans came, and he would explain it. Mr. Winans came, and gave us the necessary directions.

40. To the fortieth interrogatory, he says: I do not remember any other facts than those I have already stated.

41. To the forty-first interrogatory, he says: I have looked at said drawing, marked "Dromedary," and it is a true representation of the car Dromedary, built on said Baltimore and Ohio Railroad.

42. To the forty-second interrogatory, he says: I have looked at said drawing, and the same is a correct representation of the car Comet, built (as before stated by me) on said road.

43. To the forty-third interrogatory he says: I have looked at the said drawing "A." It is a burthen-car. The only difference I see is that the Washington car had a heavy frame for the body to set on, while this is framed into the side-pieces. The trucks are on the same principle as the Washington cars, which were passenger-cars; and this differs from them in being a burthen-car.

44. To the forty-fourth interrogatory, he says: When I left, in 1840, there were several hundred eight-wheel cars constructed according to said patent and specification. Further I cannot answer.

CROSS-EXAMINED.

(*For Cross-interrogatories, see p. 317.*)

X 1. To the first cross-interrogatory, he says: Yes.

X 2. To the second cross-interrogatory, he says: I did not see said drawing brought there.

X 3. To the third cross-interrogatory, he says: The whole of them; the Columbus, Winchester, Dromedary, and Comet, were drawn by horses.

X 4. To the fourth cross-interrogatory, he says: On July 4, 1831, when the car Columbus ran to Ellicott's Mills, no other car was attached to her.

X 5. To the fifth cross-interrogatory, he says: They were just common stone car-platforms, the common platform-car with four wheels under it, and permanently attached to it with a perch at each end. The platform was laid on the frame of the car, scantling, six by six, twelve feet long between standards, was fastened down to the platform, running fore and aft with the perch, one piece on each side. Standards were framed into these pieces, and the standards were connected at the top by chains, to keep the wood from tumbling off. Four wheels were all that were used under each car; no double trucks that I recollect of. The timber-cars had a common bolster thrown on the cars, and the timber was laid on the bolster. The timbers were not fastened to the bolsters at all. The two cars were connected together by a piece of scantling, with a hole bored in it at each end, and this was placed on the perch-pin to keep the cars from spreading apart.

X 6. To the sixth cross-interrogatory, he says: I remember to have seen one such car as is described in the interrogatory, on said road; but whether I saw it before the Columbus was built I cannot now recollect.

X 7. To the seventh cross-interrogatory, he says: There was a pin of wood through the bolster and the platform, the bolsters rested on the platform, and were the ordinary wagon-bolsters, and operated like them. The trucks were connected together by a coupling. I do not recollect how far apart the bearing points of the wheels were.

The axes of the wheels were kept in place by the boxes and bearings being bolted to the side-pieces of the car.

X 8. To the eighth cross-interrogatory, he says: I have said there were none on the wood-cars.

X 9. To the ninth cross-interrogatory, he says: There were no eight-wheel wood-cars that I know of. In the timber car, I saw the timber was just laid on the bolster without fastening.

X 10. To the tenth cross-interrogatory, he says: When I was working upon the trucks of the Columbus, I had not said drawing before me; I had the copy made from it by Conduce Gatch on his draft-board.

X 11. To the eleventh cross-interrogatory, he says: Yes; I received directions from said Gatch to go on and make the trucks of the car Columbus.

X 12. To the twelfth cross-interrogatory, he says: Sometimes I received directions from the said Gatch how to do the work.

X 13. To the thirteenth cross-interrogatory, he says: Yes; said Gatch made a drawing of the running-gear of said car from Winans' drawing, as I have before stated; it was a copy, and on a board (a draft-board).

X 14. To the fourteenth cross-interrogatory, he says: Said Gatch did not make said drawing, he copied it from Winans'. I saw him copy it.

X 15. To the fifteenth cross-interrogatory, he says: When Gatch made the copy, I and Frost were present.

X 16. To the sixteenth cross-interrogatory, he says: I cannot say; but I guess Mr. Winans saw the drawing on the draft-board. Mr. Winans was there, backwards and forwards, and may have seen the copy on the draft-board of Gatch.

X 17. To the seventeenth cross-interrogatory, he says: The only cars of which I have spoken, I mean passenger-cars, which were drawn by the perch, were the Columbus, Dromedary, and Comet. The Winchester was drawn by the body, as were all the Washington cars.

X 18. To the eighteenth cross-interrogatory, he says: The said car Columbus was made according to said drawing.

X 19. To the nineteenth cross-interrogatory, he says: The running gear of said car was made according to the drawing on Gatch's draft-board, taken from the drawing in Cromwell's room. He directed us to go on with the work, and, as boss of the shop, he overlooked us; and where Gatch did not understand the drawing, Mr. Winans explained it to us. As boss, we minded any orders said Gatch gave us.

X 20. To the twentieth cross-interrogatory, he says: My duty as superintendent of cars was to keep them in proper order to run.

X 21. To the twenty-first cross-interrogatory, he says: I do not recollect, but I do not think I did work on the Comet.

X 22. To the twenty-second cross-interrogatory, he says: I do not remember, and do not think I have stated any thing about the difference between the Washington cars and the Comet. The Comet,

however, did not differ from the Columbus, except in the construction of her body; and I have, as far as I can recollect, stated in my examination, in chief, the difference between the Columbus and the Washington cars, with which I am well acquainted.

X 23. To the twenty-third cross-interrogatory, he says: I have, in my answer to the twenty-third direct interrogatory, enumerated all the differences between the Washington cars and the Columbus that I can remember at this time; and the Comet, of which I have spoken in my preceding answer, only differed from the Columbus in the form and construction of her body, the Comet having five bodies, three of which hung between the wheels.

X 24. To the twenty-fourth cross-interrogatory, he says: I never received any letter whatever from said Winans.

X 25. To the twenty-fifth cross-interrogatory, he says: I have had many conversations with different persons in relation to my knowledge of this subject; but how often I cannot say, nor when they took place, or with whom. I have been examined at Canandaigua, and at New York, and elsewhere, and at such times have conversed with the counsel and others during the progress of the cases; but who the persons were, or what the precise nature of the conversation, I do not remember.

X 26. To the twenty-sixth cross-interrogatory, he says: This is the first time I ever saw any such drawings, except in the trials in which I was examined, when similar ones were shown me on my examination. I never saw them any where else that I can remember. I knew them to be true copies, because they were exactly like the car. I never was told that they were true copies. It must have been at the trial at Canandaigua that I first saw said drawings.

X 27. To the twenty-seventh cross-interrogatory, he says: The first time I communicated to any one what I knew in regard to the drawing mentioned in the sixth direct interrogatory, was in New York, and in the presence of Mr. Sickles, Mr. Winans, and Mr. Gould, as well as I can now remember. The said drawing was produced; and instantly, upon seeing it, I said it was the drawing of the "old car Columbus," but that it had been much defaced by smoke or fire. This may have been in Canandaigua, where I know I saw it; but I think I first saw it in New York.

X 28. To the twenty-eighth cross-interrogatory, he says: Said drawing, when I first saw it after 1840, was in Mr. Gould's possession, I think; that is, in his hands.

X 29. To the twenty-ninth cross-interrogatory, he says: After the car Columbus was built, I don't recollect seeing said drawing until I saw it as stated in my previous answers, and do not know what became of it. I have already stated where I next saw it, and in whose possession, as I now remember.

X 30. To the thirtieth cross-interrogatory, he says: I do not know what became of Gatch's copy of the running gear made upon the board. It knocked about the shop for a while, and what afterwards came of it I do not know.

X 31. To the thirty-first cross-interrogatory, he says: I have been

called on to testify and to make affidavits about the eight-wheel car constructed by Winans, and on his part and behalf. I think I gave testimony three or four times, and made one affidavit. I made the affidavit in Baltimore, was examined in Canandaigua and in New York; and I think, but I am not certain, that this is the second time I have been examined in Baltimore. The dates I cannot give, as I do not remember them. I never received more than would pay and did pay my expenses, and never received any thing for my trouble in travelling about. I was allowed a dollar and a quarter and a dollar and a half per day for my time. I have never been promised any thing, do not expect, and have no right to expect any thing, beyond my expenses and my daily wages.

31½. To the thirty-first and one-half interrogatory, he says: I am not now, nor have I been since 1840, in the employ of any one. I am and have been farming.

MICHAEL M. GLENN.

[Adjourned to the 3d day of March, 1854.]

On the 3d day of March, 1854, appeared before me Michael M. Glenn.

And the said Michael M. Glenn, having been by me first carefully examined and cautioned, and duly sworn to testify the whole truth, and being examined upon the interrogatories annexed to the Commission, deposed, answered, and said:—

(*For Additional Interrogatories, see p. 291.*)

(57.) 1. To the first interrogatory. I am not certain in what year they were placed on the road. I think one of them was placed upon the road in 1833 or 1834; but I am not positive as to the date, it has been so long since. I cannot state the date, with certainty, when either of said cars was first placed on the road.

(58.) 2. To the second interrogatory. There were two separate four-wheel cars used. They were not joined together at all. One was used to convey the carriage, and the other the horses. The cars used were common four-wheel stone cars, consisting of a simple platform; the carriage was run upon one, and pieces nailed down on the platform, alongside of the wheels, and pieces nailed crosswise, alongside of the spokes, to keep the carriage from running off. I fixed the car, or assisted in doing the fixing; and I received my orders from Mr. Gatch, the foreman of the shop. The car to carry the horses had a rack around, fastened to the platform. I also assisted in making it.

(59.) 3. To the third interrogatory. The horses and mules that were carried over the road prior to 1835, were mostly those belonging to the railroad company; occasionally they took horses and mules for other persons,—that is, when offered,—but not many were so taken. They were all conveyed on four-wheel cars, made with a rack around the body, to keep the horses or mules in.

(60.) 4. To the fourth interrogatory. In 1831, in the early part, I

saw a drawing of an eight-wheel car in Cromwell's shop. The Columbus was constructed from that drawing. The drawing was brought to the shop by Ross Winans, and I suppose he made it, and it was always understood so; but I did not see him make it. Mr. George Brown was with Winans when he brought it to the shop; so I was informed by Cromwell, who first showed it to me.

(61.) 5. To the fifth interrogatory. It represented an eight-wheel car completed, ready to run on the road.

(62.) 6. To the sixth interrogatory. I don't know what became of it. Cromwell had it in his possession; after the car was finished, he kept it.

(63.) 7. To the seventh interrogatory. I don't know any thing of the matter mentioned in this interrogatory.

(64.) 8. To the eighth interrogatory. I don't know any thing of the matter inquired of in this interrogatory.

(65.) 9. To the ninth interrogatory. That is the drawing of the Columbus, mentioned in answer to the fourth interrogatory.

(66.) 10. To the tenth interrogatory. There are no lines on it now that were not on it when I first saw it. It is the same exactly now as it was then, with the exception of the smoke and effects of age. The drawing is still the same.

(67.) 11. To the eleventh interrogatory. I don't know of any other matter, or thing, of advantage to either party.

[Adjourned until the 4th day of March, 1854.]

On the 4th day of March, 1854, the said Michael M. Glenn appeared before me again, and, being examined upon the cross-interrogatories annexed to the Commission, further deposed, answered, and said:—

(*For Cross-interrogatories, see p. 292.*)

(68.) X 1. To the first cross-interrogatory. There was a carpenter-shop, of which Mr. Gatch was foreman. Mr. Oliver Cromwell carried on the coach-shop, and Leonard Forrest was the blacksmith; had a separate shop, and one hand who worked with him. John Eichelberger was the painter. He had no separate shop; his materials, &c., I think, were kept in Cromwell's shop.

(69.) X 2. To the second cross-interrogatory. In the carpenter's shop there was Conduce Gatch, the foreman, myself, Jacob Rupp, and Washington O. Frost. I can't state the years in which these persons worked in the shop; but they were all there in 1830, 1831, and 1832, I think. There were other persons who worked, at different times, in the shop, whose names I cannot remember. In Cromwell's shop there was Cromwell and Francis Gatch; they worked there in 1830, 1831, and 1832, I think. I am not positive about 1830, as to Cromwell; but I think Francis A. Gatch did. Leonard Forrest was there in 1830, 1831, and 1832, and I think later; but of this I am not satisfied. He had one helper, whose name I do not recollect. I have stated the names of all I recollect; but there were others, of whom I have

no distinct recollection. There was, I think, a man named Reynolds about one of the shops.

(70.) X 3. To the third cross-interrogatory. I became acquainted with George Gillingham, I think, in the early part of 1831; perhaps as early as 1830. He then carried on a blacksmiths' shop in the city, and was in the habit of doing work for the company. He afterwards, when Mr. George Brown gave up the superintendence of the machinery-department, was appointed general superintendent of machinery by the Baltimore and Ohio Railroad Company. I don't recollect the date of his appointment, nor the years during which he served. I think he remained up to 1834 or 1835. I only know that he was in the habit of giving orders and directions about the machinery, and was generally understood to be the superintendent of that department.

(71.) X 4. To the fourth cross-interrogatory. I know Jonathan Knight was chief engineer of the company. I don't recollect when he was appointed, nor how long he remained in the service of the company; nor do I know what his duties were.

(72.) X 5. To the fifth cross-interrogatory. Mr. Ross Winans was about the shops of the company almost every day, giving instructions about different parts of the machinery, how to construct it, &c. I know this of my own knowledge; and I understood that he was appointed by the company to get up machinery, devise plans, and give instructions how to carry out his plans, &c. Mr. Gatch was only foreman there, and could do nothing without orders from the officers of the company. I knew this to be a fact. I don't derive any of my information from either printed or written documents.

(73.) X 6. To the sixth cross-interrogatory. I don't recollect the rate of speed.

(74.) X 7. To the seventh cross-interrogatory. I did not see the drawing made. I did see a drawing of the trucks made on a draft-board, by Gatch; which drawing he made from the original drawing of the Columbus that Cromwell had. That was in the year 1831; but I can't give the precise date.

(75.) X 8. To the eighth cross-interrogatory. He gave instructions how to go on with the building of the Columbus. If we were at a loss what to do, he would inform us. He was not superintendent of the shops; but he had charge of getting up machinery, and he gave advice and instructions about what was to be done. All of this I know of my own knowledge. He was frequently about the shops.

(76.) X 9. To the ninth cross-interrogatory. I worked in the carpenter-shop. Heard Winans, time after time, giving directions about the Columbus. I particularly recollect hearing him give directions about the manner of fixing the bolsters, and other directions about the trucks. I can't give either the language or substance of what he said, it has been so long since. He gave directions sometimes to Mr. Gatch, and sometimes to me, and the other workmen who were at work on it; generally, however, to Mr. Gatch. I can't state who were present, except that the workmen generally were, and Mr. George Brown was sometimes present. Jacob Rupp, Washington O. Frost, and myself, worked upon the truck of the Columbus; there might have

been others, but I don't recollect that there were. Cromwell and Francis A. Gatch worked on the body. Leonard Forrest and his helper did the blacksmith's work, and John Eichelberger painted her.

(77.) X 10. To the tenth cross-interrogatory. It does not differ any from the drawing marked "Oliver Cromwell, No. 1" (instead of Columbus).

(78.) X 11. To the eleventh cross-interrogatory. I saw her last in 1835 or 1836 running on the road. I don't know what became of her.

(79.) X 12. To the twelfth cross-interrogatory. It was made on a scale of three-quarters of an inch to the foot.

(80.) X 13. To the thirteenth cross-interrogatory. The Columbus, when built, had friction-wheels. She had no springs, and was drawn by the perch. The other matters inquired of I cannot answer, as I do not recollect the particulars.

(81.) X 14. To the fourteenth cross-interrogatory. None of the cars mentioned in this interrogatory had friction-wheels; and all of them had springs, with plain boxes and bearings. The Winchester had three swelled sides, built like three coach-bodies, placed upon a straight frame, and was drawn by the body. The Comet had five bodies; three of which were placed between the trucks, and one at each end raised higher than the three; she was drawn by the perch. The Dromedary had four bodies, all of which were between the trucks, and hung very low and near to the rails; she was also drawn by the perch. The Washington branch-cars were built with a long body, and a frame under the body, separate from it, which hung down below the truck; they were drawn by the body. The wheels in all the cars on the road were about the same size; I think about thirty to thirty-one inches. The other matters inquired of in this interrogatory I cannot answer, as I do not particularly recollect with regard to such matters.

(82.) X 15. To the fifteenth cross-interrogatory. I do not recollect of seeing any plans, nor hearing any instructions given by Winans, about said cars. At the time these cars were being built, I was not regularly employed in the shops, but was engaged in different kinds of work on the road, for Mr. John Elgar, until 1834, when Mr. Gatch was discharged from the service of the company, and I was put in his place as foreman of the shops at the Mount Clare Depot.

(83.) X 16. To the sixteenth cross-interrogatory. I did not build the Washington cars, or assist in building them. They were built at the Charles-street shops, and I was at the Mount Clare shops at the time. I saw no plans, and heard no instructions given with reference to them.

(84.) X 17. To the seventeenth cross-interrogatory. He was only foreman of the shops. He had no power or duties except what he received from the officers of the company. I often heard him say he could not devise any plans without the orders of the officers of the company. I have no knowledge of any by-laws or rules of the company on the subject. He had general orders from the officers to buy materials to be used in the shops. Orders were given for such

number of cars, of a particular description, as were wanted; and he was directed to procure the materials necessary to build that number. These are all matters that I know of my own knowledge. I have heard Gatch frequently say he had orders to build such a number of stone cars, or the like, and he would then procure the necessary materials.

(85.) X 18. To the eighteenth cross-interrogatory. He did.

(86.) X 19. To the nineteenth cross-interrogatory. I did not see the drawing made, nor do I know when it was made. I first saw it in Cromwell's shop. It was shown to me by Cromwell. She was, to my personal knowledge, built by the said drawing; we had nothing else to go by. The drawing remained in Cromwell's possession the whole time the Columbus was being built, except when Gatch had it to make the drawings for the trucks on the board. I have neither the original, nor a copy, to annex to my answers.

(87.) X 20. To the twentieth cross-interrogatory. I cannot answer all the questions, as I did not build said cars, or assist in building them, and saw no plans. The cars had iron bolsters. The trucks had two side-pieces, made of wood and plated with iron. The cross-rods that kept the frame together were of iron, with nuts on the ends of the cross-bars, to screw up the frame when it got loose. The side motion was prevented by a roller on the lower bolster, and a plate on the upper one. The body was much wider than the trucks. The trucks had springs, with plain boxes.

(88.) X 21. To the twenty-first cross-interrogatory. They were all put in public use on said road as fast as they were built, with the knowledge of Winans; but, whether with his approbation and consent or not, I do not know. The Columbus was put on the road on the 4th July, 1831. I don't recollect the dates when the others were first put on the road. They were all continued in use on the road for several years, and until they were pretty much broken up; but I can't give the precise time each of them was so used.

(89.) X 22. To the twenty-second cross-interrogatory. I have never been employed by Winans, or any person interested in the eight-wheel car-patent, that I know of. I have no interest, directly or indirectly, in this suit or in the said patent. I know several of the witnesses examined in said suits, and have conversed with them. None of them are in Winans' employment, or in the establishment in which he is interested.

(90.) X 23. To the twenty-third cross-interrogatory. I have made no statement with regard to the matters set forth in this interrogatory, and cannot therefore answer the same.

(91.) X 24. To the twenty-fourth cross-interrogatory. I answer as to this interrogatory the same as to the twenty-third cross-interrogatory, viz. that I know nothing of the matters inquired of in it.

(92.) X 25. [The twenty-fifth cross-interrogatory omitted in the Commission.]

(93.) X 26. To the twenty-sixth cross-interrogatory. I don't know any thing about the matters inquired of in this interrogatory.

(94.) X 27. To the twenty-seventh cross-interrogatory. I did not

see, hear, or have the substance of said interrogatories and cross-interrogatories communicated to me, or know any thing in relation to them, until they were propounded to me by the Commissioner. I had conversations with Mr. Gould, in which he told me I had to come here and answer such questions as were asked; but he did not tell me what the questions were. I have seen the affidavits that have been given; they have been printed, and I have one of the books containing them. There is not a man of the witnesses that I know, that is or ever was in the employment of Ross Winans, or any of his sons, to the best of my knowledge.

(95.) X 28. To the twenty-eighth cross-interrogatory. All that I have stated I have stated from my own personal knowledge.

(For Special Cross-interrogatories, see p. 297.)

(96.) X 1. To the first special cross-interrogatory. I have been examined three times, I believe.

(97.) X 2. To the second special cross-interrogatory. I was examined before Mr. Carrere, but I do not recollect what railroad company was a party. This was about a month ago.

(98.) X 3. To the third special cross-interrogatory. Yes, I did.

(99.) X 4. To the fourth special cross-interrogatory. I first saw it in the hands of Oliver Cromwell, in the spring of 1831, at his shop. It was there for the purpose of working by. It was not then smoked. It was painted then as it is now. It was not covered on the back at all. It has not been altered, except by smoke and old age. My attention was particularly called to it by Cromwell, because it was something new. I do not know of my own knowledge who made the drawing. There are no alterations upon it.

(For Additional Interrogatories, see p. 298.)

(105.) 1. To the first additional interrogatory. Cars, similar to the one in the drawing marked B. H. L., were used on the Baltimore and Ohio Railroad in 1831, and from that time up to the present day, with the exception that, shortly after their first introduction, the friction-boxes, which are represented in the drawing, were removed, and have not since been used. They were used for hauling flour, earth, iron-ore, and other articles. There were a great many used in 1831 and 1832, and up to the time when the eight-wheel cars were brought into use.

(106.) 2. To the second additional interrogatory. In 1835 or 1836, I am not sure which.

(107.) 3. To the third additional interrogatory. He was in the service of the company, as foreman of the shops, when I went there.

(108.) 4. To the fourth additional interrogatory. He had no authority, that I know of, to construct any other cars than such as were ordered by the officers of the company.

(109.) 5. To the fifth additional interrogatory. I don't know any thing further.

(For Additional Cross-interrogatories, see p. 299.)

(110.) X 1. To the first additional cross-interrogatory. I did not mean to include such temporary cars in my answer to said question. There were temporary cars made by putting a bolster on each of two ordinary stone-cars, and a coupling put on the perch-pintles, to keep them from spreading apart when the timber was thrown on the bolsters. I don't recollect whether such cars were temporarily put together and used before any eight-wheel passenger-car was constructed, or afterwards; but I think they were used before any eight-wheel passenger-car was constructed.

(111.) X 2. To the second additional cross-interrogatory. The answer is derived altogether from my own personal knowledge.

(112.) X 3. To the third additional cross-interrogatory. I knew Conduce Gatch before he entered into the service of the company. I had no personal knowledge about the engagement he entered into with the company, and was not present when it was entered into.

(113.) X 4. To the fourth additional cross-interrogatory. I don't know whether his duties were regulated by any by-laws or rules or written regulations. I never saw any. From what I saw, and heard him say, I understood he was altogether under the control of the officers of the company.

(114.) X 5. To the fifth additional cross-interrogatory. It was his duty to obey the officers of the company. He was not under the particular direction of Mr. Knight, who was chief engineer. I never saw him more than once or twice in the shops. He was more particularly under the direction of George Brown, John Elgar, and Ross Winans, I thought; for they were frequently at the shops giving orders.

(115.) X 6. To the sixth additional cross-interrogatory. Yes; he was the foreman of the shops, directed the men, paid them off, and bought materials. He also hired the workmen.

(116.) X 7. To the seventh additional cross-interrogatory. I worked in and out of the carpenter-shop at Mount Clare, from the year 1830 — the early part of 1830 — to 1834, when I was appointed foreman. I worked sometimes in the shop, and sometimes on the road, under the directions of John Elgar. When at work in the shop, I worked in the shop of which Conduce Gatch was the boss.

(117.) X 8. To the eighth additional cross-interrogatory. I know, from what I saw, that he had no authority to construct any thing without orders from the officers of the company. His authority was only over the men employed in the shops, and to purchase the necessary materials to build such cars, &c., as were ordered.

(118.) X 9. To the ninth additional cross-interrogatory. I was employed from 1830 to 1839 or 1840, in the service of the Baltimore and Ohio Railroad Company, as carpenter from 1830 to 1834, and from that time to 1839 as foreman of the shops at Mount Clare. During all that time, I resided near the depot. Since that time, with the exception of six months, I have been engaged in farming in Kent County, Maryland. In April, 1853, I went into the service of the

Baltimore and Ohio Railroad Company, to take charge of some hands who were repairing cars, &c. In October of the same year, some of my family being taken sick, I quitted the service of the company, and returned to my farm, and now reside on it.

(119.) X 10. To the tenth additional cross-interrogatory. I never was employed in the service of either of the gentlemen named, or of any firm in which they are interested.

(120.) X 11. To the eleventh additional cross-interrogatory. Some two or three times I went to look up some witnesses, whom Mr. Gould could not find, and whom I knew.

(121.) X 12. To the twelfth additional cross-interrogatory. I am, and have, since 1840 (with the exception of the time above mentioned, when I was in the service of the Baltimore and Ohio Railroad Company), been engaged in farming my own land, and am not in the employment of any one.

(122.) X 13. To the thirteenth additional cross-interrogatory. I have been a witness in other cases, and talked the matter over with Mr. Gould and Mr. Winans at those times; but I have had very few words with Mr. Gould about my testimony in this case. I have had various conversations with other persons on the subject, whose names I do not recollect, nor how often.

(123.) X 14. To the fourteenth additional cross-interrogatory. I have no interest, and never had, in the success of the patent of the eight-wheel car, or in this or any other suit depending on the question.

(124.) X 15. To the fifteenth additional cross-interrogatory. I never did.

(125.) X 16. To the sixteenth additional cross-interrogatory. I do not recollect how many years she ran. She was broken up at last. The company got better cars, and she was put off the road.

(126.) X 17. To the seventeenth additional cross-interrogatory. I don't recollect.

(127.) X 18. To the eighteenth additional cross-interrogatory. On the inside.

(128.) X 19. To the nineteenth additional cross-interrogatory. There never was any such change made whilst I was in the service of the company.

[Answers to special cross-interrogatories omitted in their proper place by mistake, the Commissioner having overlooked them.]

MICHAEL M. GLENN.

Subscribed before

LEVIN GALE, *Commissioner.*

[Adjourned until the 10th day of March, 1854.]

CIRCUIT COURT OF THE UNITED STATES, }
DISTRICT OF MASSACHUSETTS. — October Term, 1852. }

ROSS WINANS vs. THE EASTERN RAILROAD COMPANY,

IN EQUITY.

Cross-interrogatories, to be proposed in the aforesaid case, to WASHINGTON O. FROST, of Hallowell, Me., on behalf of the Respondent.

X 1. Have you been called as witness for Ross Winans in any former trial? If so, state when and what it was.

X 2. Were you once an apprentice to Conduce Gatch? When, where, and at what trade; and what did you do?

X 3. From whom did you derive all the instruction you ever received as to car-building?

X 4. Who had charge of both the wood and iron-work at the car-building shop, on the Baltimore and Ohio Road? What was the shop then familiarly called?

X 5. Who was foreman of said shop?

X 6. Under whom did all the workmen (who worked on the cars) work; and from whom did you all receive your instructions?

X 7. Who were the workmen working on said cars, if any, who worked under the directions of Conduce Gatch? Please give their names, mentioning those who worked at the commencement of it, at the first shop; and also those who thus worked after you went down to the Charles-street shop.

X 8. At what date did you work at the Pratt-street shop, or the Mount Clare shop; and when did you move down to the Charles-street shop?

X 9. When you moved to the Charles-street shop, who took your place at the Mount Clare shop?

X 10. How long did you remain in the employ of the company?

X 11. Did Glenn remain out at the Mount Clare shop, with Francis A. Gatch; and, if so, what did they have to do out there?

X 12. Do you consider yourself acquainted with the principles of mechanics applied to machinery, and with the construction and operation of railroad-cars generally? If so, how many years have you been conversant with this business?

X 13. Were there not several cars put in operation on the Baltimore and Ohio Railroad, having eight wheels each, in the fall or winter of the year 1830, which have been in use from that time for several years, and are still in use, so far as you know?

X 14. Are these cars the same, or not the same, in principle, as the eight-wheel car now used on that road, and generally throughout the United States? If there is any difference in principle, will you please point it out?

X 15. How many of the eight-wheel cars were built and used on the Baltimore and Ohio Railroad in 1830, or before that time?

X 16. For what purpose were they used?

X 17. Had said eight-wheel cars double-trucks to each car?

X 18. Of what did each truck consist; that is, of how many axles, and how many wheels each?

X 19. Were said axles kept parallel, and at a fixed distance apart? If yea, how?

X 20. Was there a bolster on top of each of the truck-frames? How was it placed?

X 21. Was there an *upper bolster* on top of the lower bolster on each of the trucks, connected with the lower bolster by a swivel-pin?

X 22. Were timbers or stringers, reaching from the upper bolster of one truck to the upper bolster of the other truck, fastened upon such upper bolster?

X 23. Were these timbers or stringers so fastened to the upper bolsters, as to make with them a solid frame unyielding, on which to carry freight of wood, timber, &c.?

X 24. Were the trucks underneath the upper solid frame-work, and connected to it by the swivel-pin, free to yield to the curves and inequalities of the road, either way, while the platform or body-part of the car was unyielding, as the cars are which are now in ordinary use?

X 25. What was the position of these trucks, in relation to the length of the platforms or bodies? Were they placed near the ends, or how?

X 26. How far apart were the bearing-points of the truck-wheels? And why was this arrangement of the wheels adopted?

X 27. What was the lengths of the car-bodies or platforms?

X 28. How were they drawn? By perches or otherwise?

X 29. As to the car Columbus, if you testify that you have knowledge of her, do you, or do you not, remember the particulars of her construction?

X 30. Was the running-part of the Columbus built like that of the aforesaid timber or freight-car? If not, what was the difference?

X 31. How was she drawn?

X 32. Was any change in proportion made between this car and the timber-cars? What was it?

X 33. Who made the original drawings of the trucks or running-gear of the car Columbus?

X 34. Do you know this of your own personal knowledge? Did you see any one make them? If so, when, where, and whom, did you thus see make them?

X 35. Were said drawings copied from any thing?

X 36. What was the difference between said drawings of the running-gears, if any, and the running-gear of the timber or freight-cars?

X 37. What was the reason for making the alteration, if any was made? Who made it? Who gave you any reason for it, and what reason did he give?

X 38. What was the use of making the plan of the running-gear on the board?

X 39. Who explained the plan to the workmen, if any one?

X 40. Where was the body of the Columbus made? Who worked there?

X 41. Did you see the drawings in said Cromwell's shop, from which the body of the Columbus was built? Was that drawing on paper? Was it seen by you in the hands of Winans, before you saw it in Cromwell's shop? Was the body painted yellow? Have you seen it since at the trial of Winans' case, at Canandaigua, or before or since?

X 42. When it came into Cromwell's hands, was it or not examined critically? If so, by whom?

X 43. Are you positive that that drawing contained on it the *body* of a car?

X 44. Did it contain any railing upon the body?

X 45. Are you, or are you not, positive that it contained, at that time, the *running-part*?

X 46. What is your belief on this subject?

X 47. Can you say that there was any *running-part* put upon that drawing, until after *Conduce Gatch* had made his drawing on the board, of the running-part of the Columbus, or until long after the car Columbus was built?

X 48. If the running-part of the car had been on the drawing at the time you examined it, or saw it in use by Cromwell, should you not have remarked it, and what it was?

X 49. Was *any mode of drawing* the car Columbus, by perch or otherwise, shown on said paper-drawing?

X 50. What was the way in which that car was built to be drawn, in fact?

X 51. What was the name by which these eight-wheel double-truck wood or freight-cars were known by?

X 52. Were people accustomed to ride on them occasionally?

X 53. Under whose directions was the car Columbus constructed?

X 54. Did you work upon her? When was she begun, and when completed?

X 55. What was the next passenger-car built? Who built her; and upon what plan? What was her name? Did you work on her?

X 56. What was the third car? Did you work on her yourself?

X 57. How were they all drawn? How was the Comet drawn?

X 58. When did you see the Washington cars?

X 59. What were they drawn by; and what difference between them and the other cars above stated, if any?

X 60. Are you acquainted with *Conduce Gatch*? How long have you known him? What is his character for truth? What is his eputation as a mechanic?

X 61. Are you acquainted with *Jacob Rupp*? What is his character for truth, and for memory?

X 62. Have you any interest in this suit? If so, what is it?

X 63. What opportunity had said Gatch and Rupp to know who

it was that invented and built the first eight-wheel double-truck railroad-car?

WILLIAM WHITING, *Counsel for Respondents.*

A true copy. Attest,

H. W. FULLER, *Clerk.*

(*For Interrogatories, see p. 286.*)

On the eighth, ninth, tenth, and twelfth days of September, in the year of our Lord one thousand eight hundred and fifty-three, at Hallowell, in the District of Maine, Washington O. Frost, of Chelsea, in said district, personally appeared before me, Henry W. Paine, and having been first cautioned and sworn, and afterwards called upon to answer the interrogatories attached to the annexed Commission, said, in answer—

1. To the first direct interrogatory. My name is Washington O. Frost. I am forty-four years old. I am a mechanical engineer. I reside in Chelsea, County of Kennebec, and State of Maine. I have been employed as a mechanical engineer eighteen or twenty years: first and last on the Baltimore and Ohio Railroad, the Boston and Providence Railroad, the Boston and Lowell Road; in Providence, in the construction of a railroad bridge; in Bangor, in building bridges and laying track; in Attleborough, in building cars; on the Providence and Stonington Road, and on the Worcester and Norwich Road. I was then engaged in other business eight or nine years. After this, I was employed on the Boston and Fitchburg Road, and on the Kennebec and Portland Road.

2. To the second direct interrogatory. I know Ross Winans. I first became acquainted with him in Baltimore, in 1829. How or where he was then employed, I do not know; but I supposed he was then seeking employment. He shortly after went to England; and, on his return (in 1830, I think), he was employed as assistant-engineer of machinery, on the Baltimore and Ohio Railroad, under Jonathan Knight.

3. To the third direct interrogatory. I knew said Winans to be so employed by said company in 1830, 1831, 1832, 1833, and 1834. I was in the employ of said company from 1829 to 1834. It was my duty to make and repair the cars. A part of the time I was on the road, and a part of the time in the shop. It is impossible for me now to say what portion of the time I was engaged in constructing cars, or what portion in repairing cars.

4. To the fourth direct interrogatory. Said Winans was employed in drawing plans of buildings to be erected along the road, and plans of cars and machinery. He frequently called on me to assist him in his operations and experiments.

5. To the fifth direct interrogatory. I saw an eight-wheel car for the first time, in the spring of 1831, in said company's shop. Ross Winans was the author, as I understood it. At first we used to call it "Winans' Novelty," or "Winans' Car." It was built in said shop, under said Winans' direction, and according to his plan. It was built by the company, to carry passengers on their road. After its first trip, it was called the "Columbus."

6. To the sixth direct interrogatory. I did see a drawing of said car in April or May, 1831. One day Mr. George Brown came into the shop, and said to Mr. Conduce Gatch, master-carpenter, that Winans had got up a new plan for cars, and he would bring it over; and he wanted a car built after that plan, as soon as it could be done. Within a day or two after, said Brown brought the plan to the shop. I went into the room of Oliver Cromwell, the coach-maker, and saw it there.

7. To the seventh direct interrogatory. Oliver Cromwell shew me the drawing. I did not see said Winans make the drawing, but understood from said Brown that he made it. This was before the "Columbus" was constructed.

8. To the eighth direct interrogatory. When I first saw said drawing, it represented a complete car, with body and trucks or running-gear.

9. To the ninth direct interrogatory. I saw said drawing for the last time in Cooperstown, in August, 1853. It was not altered in any respect, except it was somewhat defaced by smoke. I have examined the drawing annexed to the interrogatories marked "Car Columbus, February, 1834;" and, according to my recollection, the same is a copy of the original drawing which I have spoken of.

10. To the tenth direct interrogatory. Conduce Gatch made a copy of the original drawing, of full size, on boards, with chalk or chalk-line. This was very soon after the drawing was brought to the shop — within a week. The copy was made in the company's shop, at "Mount Clare," just out of Baltimore. Gatch took the dimensions. I heard Winans tell him on what scale the drawing was made.

11. To the eleventh direct interrogatory. The entire car was constructed after this copy. Oliver Cromwell, F. A. Gatch, Jacob Rupp, Michael Glenn, John M. Egleburger, Leonard Forrest, and myself worked on the car.

12. To the twelfth direct interrogatory. Oliver Cromwell, with the assistance of F. A. Gatch, made the body; the running-gear was made by Jacob Rupp, Michael Glenn, and myself. John M. Egleburger painted the car. Leonard Forrest, the blacksmith, did the iron-work. The whole was under the supervision of Conduce Gatch.

13. To the thirteenth direct interrogatory. The car was three or four months in the course of construction. I think the body was first completed.

14. To the fourteenth direct interrogatory. When first built, the car was fitted with Winans' friction-boxes. They were adapted to permit the axles and wheels to conform partially to the curves of the road. The body of the car was attached to the truck-frame by a swivel-pin, passing through the upper and lower bolster.

15. To the fifteenth direct interrogatory. The draft was applied to a perch attached to the trucks.

16. To the sixteenth direct interrogatory. There were alterations made.

The wheels were taken off; and wheels of the same kind, with different journal-boxes, were substituted. I think the boxes substituted were Winans' or Elgar's boxes. The friction-wheels could not be chilled hard enough to give sufficient strength.

The truck-frame was made stronger by a bolster extending from one side to the other.

The draft was applied to the body instead of the trucks, so that the trucks might the more readily adapt themselves to the curves of the road.

To give additional strength to the body of the car, the iron-work in the top was made heavier.

The truck-wheels were placed nearer together. The trucks were placed nearer to the ends of the car-body. This alteration was made, the better to adapt the car to the curves of the road.

17. To the seventeenth direct interrogatory. Winans was frequently at the shop during the construction of the car, and gave directions to Gatch while the alterations were making. He was at the shop the most of the time, engaged in marking out, measuring, and giving directions.

18. To the eighteenth direct interrogatory. Said Columbus was first publicly put in use on a trip from Baltimore to Ellicott's Mills, on the fourth day of July, 1831. It answered the purpose it was intended for, only it was not strong enough for the great load it carried.

19. To the nineteenth direct interrogatory. It was not strong enough at first; but, after the alterations before mentioned, it was safe for use as a passenger-car. It was frequently used, after the alterations, as an excursion-car.

20. To the twentieth direct interrogatory. There were other cars afterwards built on the road, with the same kind of running-gear, but of different-shaped bodies. There were three of them while I was there.

21. To the twenty-first direct interrogatory. The Washington Branch was opened for travel in the latter part of 1833, or the fore part of 1834.

22. To the twenty-second direct interrogatory. I knew cars called the Washington cars, used on said branch. They were built in the Charles-street shop, in Baltimore, in 1834 and 1835. They were designed by Winans. I think Conduce Gatch superintended their construction.

23. To the twenty-third direct interrogatory. The draft was applied to the body of the Washington car. It was at first applied to the running-gear of the "Columbus." The flanges of the wheels of the Washington car were nearer together than were those of the Columbus when first built. The Columbus was a double-decker. The Washington cars were like those now in general use; the only

difference being that the former were not so long nor so highly finished as the latter.

24. To the twenty-fourth direct interrogatory. Sometime in 1833, a second eight-wheel carriage was built on the road, after the plan of the Columbus, but differing in some respects. The Columbus had but one body; the other, called the "Winchester," had three bodies. The draft was applied to the body of the Winchester, and not to the running-gear, as was the case with the Columbus. The wheels of the Winchester were nearer together than the wheels of the Columbus when first built.

Not long after, a third carriage was built after the same plan, called the "Dromedary." This car consisted of four bodies, and was suspended between the trucks.

In the course of the year, a fourth carriage was built. This was called the "Comet." This had five bodies; three of them between the trucks and one at each end, over the trucks. They were all constructed under the direction of said Winans, and he furnished the plans.

25. To the twenty-fifth direct interrogatory. No alterations were made of these cars, the Winchester, Dromedary, and Comet, so far as I recollect.

26. To the twenty-sixth direct interrogatory. The first eight-wheel cars, for the transportation of wood and lumber on this road, were constructed in the fall of 1833, I think.

27. To the twenty-seventh direct interrogatory. Up to 1833, wood and lumber were transported on four-wheel cars. In the winter of 1830 and 1831, the carriage and horses of John Quincy Adams were carried over the road as far as the "Relay House." We took a four-wheel platform-car, and on that we confined the carriage. We then put a railing round another four-wheel platform-car, excepting one end, drove in the horses, confined them with a halter, put a strip of board between them, and coupled these two cars with a perch. That was before the Columbus was built.

28. To the twenty-eighth direct interrogatory. In 1833, wood and lumber were transported on two four-wheel cars connected with a perch.

29. To the twenty-ninth direct interrogatory. William Woodville was master of transportation on the road. It was his duty to make and collect the freight-bills, and to direct the fitting of the freight-cars.

30. To the thirtieth direct interrogatory. Ross Winans claimed the invention. I often heard him say it was his plan, and express his confidence that it would be approved.

31. To the thirty-first direct interrogatory. Said Winans was spoken of and known as the inventor. The cars were known as Winans' cars.

32. To the thirty-second direct interrogatory. I consider Winans to be the inventor, and for the reasons before given.

33. To the thirty-third direct interrogatory. I have examined said Letters Patent, and the specification thereto annexed; and in my

opinion they are a sufficient guide to enable a mechanic, familiar with car-building, to construct the separate parts of the eight-wheel car, suitable for the transportation of passengers or merchandise, at the usual rates of speed.

34. To the thirty-fourth direct interrogatory. In my opinion, the specification describes the eight-wheel car now in general use.

35. To the thirty-fifth direct interrogatory. It does describe the car "Columbus."

36. To the thirty-sixth direct interrogatory. It does describe the Washington cars.

37. To the thirty-seventh direct interrogatory. I was acquainted with said Gatch upon said road. He was there all the time I was. He was master-carpenter; and it was his duty to employ and oversee the men in the shop, and to procure materials. I went there as his apprentice; and, after the term of my apprenticeship expired, I worked under him on wages.

38. To the thirty-eighth direct interrogatory. I was under no private arrangements with said Gatch, while in the employ of said company. I generally worked in the same shop with him.

39. To the thirty-ninth direct interrogatory. I have heard said Gatch speak of the invention of said car "Columbus," and have heard him declare that it was no invention at all, and he did not believe they would ever be adopted.

40. To the fortieth direct interrogatory. I do not now recollect any part which I have not already stated, tending, in my opinion, to prove said Winans to be the inventor of the eight-wheel car.

41. To the forty-first direct interrogatory. I have examined the drawing annexed to the interrogatories, marked "Car Dromedary, Baltimore and Ohio Railroad." It purports to represent the car called the Dromedary, and in my opinion is a correct representation thereof.

42. To the forty-second direct interrogatory. I have examined the drawing annexed to the interrogatories, and marked "Comet, Baltimore and Ohio Railroad." It purports to represent the car "Comet," and is a correct representation thereof.

43. To the forty-third direct interrogatory. I have examined the drawing marked A. I do not see that it differs at all from the Washington cars, before spoken of.

44. To the forty-fourth direct interrogatory. I can form no judgment.

(For Cross-interrogatories, see p. 336.)

X1. To the first cross-interrogatory. I was called as witness for said Winans, in a trial had in the city of New York, five or six years ago; and again in a trial had at Canandaigua, in the State of New York, some three years since. Last August I was called as witness for said Winans, in a trial had at Cooperstown, in the State of New York. In these suits, the validity of Winans' "eight-wheel car-patent" was contested.

X 2. To the second cross-interrogatory. I was once an apprentice to Conduce Gatch, in Baltimore. My apprenticeship commenced in 1826, and terminated in 1830.

During the first three years, I was employed at the millwright trade. The last year, I was engaged in constructing railroad-cars.

X 3. To the third cross-interrogatory. From said Conduce Gatch.

X 4. To the fourth cross-interrogatory. Said Gatch had charge of the wood and iron-work of said shop. The shop was at first called "the Pratt-street shop," afterwards the "Mount Clare shop."

X 5. To fifth cross-interrogatory. In the blacksmiths' department, Leonard Forrest was foreman. In the coach-makers' department, Oliver Cromwell was foreman. In the running-gear department, Conduce Gatch was foreman. Said Gatch had the oversight and general direction of all the departments.

X 6. To the sixth cross-interrogatory. We all worked under said Gatch, and received our instructions from him.

X 7. To the seventh cross-interrogatory. Oliver Cromwell, Michael Glenn, Jacob Rupp, John Rupp, George Miller, John McTan, Reubin Ayler, Francis A. Gatch, Emanuel Eigleburger, John M. Eigleburger, and John Emmart, worked on said cars under the directions of said Conduce Gatch, at the Mount-Clare shop. But Emanuel Eigleburger and John Emmart did not work at the Charles-street shop.

X 8. To the eighth cross-interrogatory. I worked at the "Pratt-street" or "Mount Clare" shops, till July or August, 1832, when I moved to the Charles-street shop.

X 9. To the ninth cross-interrogatory. When I moved to the Charles-street shop, Francis A. Gatch took my place at the "Mount Clare shop."

X 10. To the tenth cross-interrogatory. I continued in the employ of said company from the spring of 1829 to the fall of 1832.

X 11. To the eleventh cross-interrogatory. Glenn remained at the Mount Clare shop with Francis A. Gatch. They attended to the trucks and perches, and to the arranging of the cars.

X 12. To the twelfth cross-interrogatory. I do so consider myself. I have been conversant with the business, off and on, for eighteen or twenty years.

X 13. To the thirteenth cross-interrogatory. There were no eight-wheel cars in operation on said road in the fall or winter of 1830, to my knowledge. We used sometimes to connect two four-wheel cars by a perch, ring, or link.

X 14. To the fourteenth cross-interrogatory. These connected four-wheel cars were entirely different from the eight-wheel cars now in use on said road, and generally throughout the United States. The main difference in principle is this: The body of the four-wheel car was necessarily bolted to the frame-work of the wheels, so that there was no motion of the wheels, except as connected with the movement of the body. The body of the eight-wheel car was attached to the truck-frame by a swivel-pin, so that the wheels could the better follow the curves of the road.

X 15. To the fifteenth cross-interrogatory. There were no eight-wheel cars built or used on said road in 1830, or before that time.

X 16. To the sixteenth cross-interrogatory. There were no such cars.

X 17. To the seventeenth cross-interrogatory. Prior to 1831 there were no cars on said road with double-trucks.

X 18. To the eighteenth cross-interrogatory. I refer to my answers to the preceding interrogatories.

X 19. To the nineteenth cross-interrogatory. I refer to my previous answers.

X 20. To the twentieth cross-interrogatory. I refer to my previous answers.

X 21. To the twenty-first cross-interrogatory. I refer to my previous answers.

X 22. To the twenty-second cross-interrogatory. I refer to my previous answers.

X 23. To the twenty-third cross-interrogatory. I refer to my previous answers.

X 24. To the twenty-fourth cross-interrogatory. I refer to my previous answers.

X 25. To the twenty-fifth cross-interrogatory. I refer to my previous answers.

X 26. To the twenty-sixth cross-interrogatory. I refer to my previous answers.

X 27. To the twenty-seventh cross-interrogatory. I refer to my previous answers.

X 28. To the twenty-eighth cross-interrogatory. I refer to my previous answers.

X 29. To the twenty-ninth cross-interrogatory. I do remember the particulars of the construction of the car Columbus.

X 30. To the thirtieth cross-interrogatory. The running-gear of the Columbus consisted of two sets of trucks; each set having four wheels, and supporting a solid frame, which was attached to the body by a swivel-pin. Prior to the construction of the Columbus, there were no eight-wheel or truck-cars.

X 31. To the thirty-first cross-interrogatory. At first, the Columbus was drawn by a perch attached to the running-gear; afterwards, she was altered in this particular, and the draft was applied to the body.

X 32. To the thirty-second cross-interrogatory. The timber-cars were four-wheel cars, and were not so long as this car.

X 33. To the thirty-third cross-interrogatory. Ross Winans, as I understood it.

X 34. To the thirty-fourth cross-interrogatory. I do not know this of my own personal knowledge. I did not see Winans make the drawings.

X 35. To the thirty-fifth cross-interrogatory. As I did not see the drawings made, I cannot say whether they were copied or not.

X 36. To the thirty-sixth cross-interrogatory. I have already stated the difference between the running-gear of the Columbus and

the running-gear of the timber-car in use before the construction of the Columbus.

X 37. To the thirty-seventh cross-interrogatory. I did not understand that there was any alteration of the timber-cars.

X 38. To the thirty-eighth cross-interrogatory. The object of making the plan of the running-gear on the board was to facilitate the work. It was more easy to work after a plan of full size.

X 39. To the thirty-ninth cross-interrogatory. I often heard said Winans explain the plan to Conduce Gatch. Gatch would often send me for Winans, when he needed an explanation.

X 40. To the fortieth cross-interrogatory. The body of the Columbus was made at the "Pratt-street" or "Mount Clare" shop. Oliver Cromwell and F. A. Gatch worked upon the body. John Rupp, I think, made the sash for the windows, and John Mr. Egleburger painted it.

X 41. To the forty-first cross-interrogatory. I saw said drawings in said Cromwell's shop. The drawing was on paper. I did not see it in Winans' hands before I saw it in said shop. The body was painted yellow. I saw this drawing at Canandaigua, never before, as I recollect, after I left Baltimore. I saw it again in Cooperstown last August.

X 42. To the forty-second cross-interrogatory. It was critically examined by Gatch, Cromwell, myself, and the workmen generally. I think by Glenn more carefully than by any other.

X 43. To the forty-third cross-interrogatory. I am positive.

X 44. To the forty-fourth cross-interrogatory. It did.

X 45. To the forty-fifth cross-interrogatory. I am positive that the drawing contained at that time the running-part.

X 46. To the forty-sixth cross-interrogatory. I know it did.

X 47. To the forty-seventh cross-interrogatory. I am sure the running-part of the car was put upon the drawing before Conduce Gatch made his drawing on the board of the running-part.

X 48. To the forty-eighth cross-interrogatory. I did remark it.

X 49. To the forty-ninth cross-interrogatory. The mode of drawing said car, as shown on said paper, was by the perch.

X 50. To the fiftieth cross-interrogatory. The car was, in fact, built to be drawn by the perch.

X 51. To the fifty-first cross-interrogatory. Prior to the construction of the Columbus, there were no eight-wheel or double-truck freight-cars. The eight-wheel freight-cars afterwards built were called Winans' cars.

X 52. To the fifty-second cross-interrogatory. Not to my knowledge.

X 53. To the fifty-third cross-interrogatory. Under the direction of said Winans.

X 54. To the fifty-fourth cross-interrogatory. I did work upon the Columbus. She was begun and finished at the Mount Clare shop.

X 55. To the fifty-fifth cross-interrogatory. The next passenger-car built was an eight-wheel car. She was built by Gatch, upon the

plan of Winans'. She was called the Winchester. I do not recollect of working on her.

X 56. To the fifty-sixth cross-interrogatory. The third was an eight-wheel car, called the Dromedary. I did not work on her.

X 57. To the fifty-seventh cross-interrogatory. The draft was applied to the body of the Winchester and Comet. It was also applied to the body of the Columbus.

X 58. To the fifty-eighth cross-interrogatory. In 1834, for the first time.

X 59. To the fifty-ninth cross-interrogatory. They were drawn by the body. As to running-gear, there was no difference between the Washington cars and the Columbus, Winchester, Dromedary, and Comet. The bodies were not alike.

X 60. To the sixtieth cross-interrogatory. I was acquainted with Conduce Gatch. Have known him from 1826. I never heard any thing against his character for truth. He was reputed to be a good mechanic.

X 61. To the sixty-first cross-interrogatory. I was acquainted with Jacob Rupp. I never heard any thing against his character for truth. I used to consider him rather forgetful.

X 62. To the sixty-second cross-interrogatory. I have no interest in this suit.

X 63. To the sixty-third cross-interrogatory. I have already stated what means they have, so far as I know.

WASHINGTON O. FROST.

The foregoing answers were made by the Deponent, on the days before named, in the manner directed by the Commission to which the interrogatories are annexed; were reduced to writing by me, and were signed and sworn to by said Deponent,

Before me,

HENRY W. PAINE.

UNITED STATES OF AMERICA.

[L. S.]

THE CIRCUIT COURT OF THE UNITED STATES, WITHIN AND FOR THE MASSACHUSETTS DISTRICT.

MASSACHUSETTS DISTRICT, ss.

To Levin Gale, or John Carrere, of Baltimore, in the District of Maryland, Esquires, United States Commissioners.

Know ye, that, reposing confidence in your wisdom, prudence, and fidelity, we have appointed, and by these presents do authorize and empower, you to take the answers to the interrogatories hereunto annexed, of James McCurley and George N. Lowrie, of Baltimore, in the District of Maryland, witnesses to be examined on behalf of the Complainant, and to be used in a certain cause now pending in

said Court, wherein Ross Winans is Plaintiff, *vs.* The Eastern Railroad Company, Defendants.

And to this end, at certain days to be by you appointed for that purpose, to cause said witnesses, as aforesaid, to be brought before you; and each witness, while present before you, to examine carefully on oath touching the premises. And, when you shall have taken the examination as aforesaid, to reduce or cause the same to be reduced to writing, and to be subscribed by each of said witnesses in your presence; and the same, so taken and subscribed, to return, together with this Commission and your doings herein, enclosed, sealed, and directed to the Circuit Court aforesaid, holden at Boston, as soon as the same may be executed.

In testimony whereof, we have caused the seal of the said Circuit Court to be hereunto affixed.

Witness, the Honorable Roger B. Taney, at Boston, this second day of February, in the year of our Lord one thousand eight hundred and fifty-four.

H. W. FULLER, *Clerk.*

N. B. — You shall not, except by consent of the parties in writing, permit either party to attend at the taking of the depositions, either himself, or by any attorney or agent, nor to communicate by interrogatories or suggestions with the Deponents whilst giving their depositions in answer to the interrogatories annexed to this Commission. And you shall take such depositions in a place separate and apart from all other persons, and permit no person to be present during such examination, except the Deponents and yourself, and such disinterested person (if any) as you may think fit to appoint as a clerk, to assist you in reducing the depositions to writing. And you shall put the several interrogatories and cross-interrogatories to the Deponents in their order, and take the answer of the Deponents to each, fully and clearly.

[N. B. Depositions to be taken on paper of like size with this Commission.]

UNITED STATES CIRCUIT COURT, }
MASSACHUSETTS DISTRICT. — May Term, 1853. }

ROSS WINANS *vs.* THE EASTERN RAILROAD COMPANY,

IN EQUITY.

Interrogatories to be proposed to James McCurley, of Baltimore, on behalf of the Complainant.

1. What is your name, age, residence, and occupation?
2. Do you know Ross Winans, the Complainant? And, if yea, how long have you known him, and where?
3. Do you know Oliver Cromwell, of Baltimore? If yea, how

long have you known him, and what is his present employment or business?

4. Whether or not was the said Oliver Cromwell in your employment at any time during either of the years 1837, 1838, or 1839? If yea, during what part of each of said years; at what kind of business; and where did you so employ him?

5. Whether or not did the said Winans ever call upon you to find or see the said Cromwell? State when he did so, and all the particulars thereof.

[Respondent objects to the statement of any conversations between said Winans and the witness.]

6. If you state that the said Winans did call upon you as aforesaid, please state whether or not did the said Cromwell at any time thereafter, and how soon, exhibit to you any drawing; and, if yea, what did said drawing purport to represent, and what was the appearance of the said drawing, and what facts did you then learn in reference to the said drawing, and from whom?

[Objected to, as calling for hearsay evidence, and as inquiring into the purport of a drawing, and its appearance; the best evidence being the drawing itself.]

7. Will you look at the drawing now shown you by the Commissioner, marked "Oliver Cromwell, No. 1," and state whether or not you have ever before seen the said drawing? And, if yea, where did you first and when last see it; and in whose hands was it then? What was its condition and appearance when *first* seen by you, compared with its present condition and appearance?

[Objected to, as no drawing is filed in the Clerk's office, or shown to the Respondent's Counsel, William Whiting, Respondent's Solicitor.]

8. If you know any other matters or things of benefit to the said Winans, in reference to the invention of the eight-wheel railroad-car, please state the same fully and particularly.

C. P. CURTIS, JR., *Complainant's Solicitor.*

To the Honorable the Judges of the Circuit Court of the United States, within and for the District of Massachusetts.

I, LEVIN GALE, the Commissioner named in the annexed Commission, do hereby certify and return to the said Court, that, in pursuance of the said Commission, I proceeded, at my office in the city of Baltimore, in a place separate and apart from all persons, to take the depositions of the witness produced before me, as follows:—

On the second day of March, 1854, James McCurley appeared before me; and, having been by me first carefully examined, and cautioned, and duly sworn to testify the whole truth, and being examined

on the interrogatories annexed to the Commission, deposed, answered, and said,—

1. To the first interrogatory. My name is James McCurley; I am forty-six years of age; reside in the city of Baltimore; and am a coach-maker.

2. To the second interrogatory. I do know Ross Winans; I first became acquainted with him about 1828, at the Mount Clare Depot, and have known him ever since. During all this time, he has been engaged either in the service of the railroad company, or else in business on his own account, near the railroad-depot.

3. To the third interrogatory. I have known Oliver Cromwell for thirty years or more; he is a coach-maker.

4. To the fourth interrogatory. Oliver Cromwell was in my employment during a part of the year 1838, and a part of the year 1839. He came into my employment about the middle of 1838, and continued through that year, and until the middle of 1839. He was with me about one year at that time. His principal work was on coach-bodies, and I employed him at my shop on Liberty-street, near Fayette-street, in the city of Baltimore.

5. To the fifth interrogatory. Whilst Oliver Cromwell was working with me, Ross Winans called at my shop to inquire for Cromwell, and I called Cromwell down stairs; and he and Winans had some conversation together, which I did not pay any attention to. After Winans left, Cromwell told me it was something about the railroad-car with eight wheels, that he had been at work on. I can't state the date of this occurrence, except that it was in 1838 or 1839, whilst Cromwell was in my employment.

6. To the sixth interrogatory. I think a day or two after Winans called to see Cromwell, Cromwell produced a drawing of an eight-wheel car on paper; the back of the drawing had been pasted over with a second piece of paper; but the drawing had the appearance of having been put over a stove-pipe or hole, and was discolored by the smoke, and there was a piece of paper pasted on the back, as Cromwell said, to hide the place, but it was visible. I learned from Cromwell that it was the drawing of the car he had been at work on, and the one Mr. Winans had come to inquire about. I think Mr. Winans claimed a patent on account of the eight wheels to the car.

7. To the seventh interrogatory. The drawing now shown to me, marked "Oliver Cromwell, No. 1," is the same drawing that Cromwell produced in 1838 or 1839, shortly after Mr. Winans inquired for him. It is the same drawing, I am sure; I cannot be mistaken, I think. I first saw it in Oliver Cromwell's hands; afterwards saw it in the hands of Mr. Charles D. Gould, and also in Mr. Carrere's hands. When I first saw it, it was not so much torn nor worn as it is now, and did not show age in its appearance as it does now; in other respects it is the same.

8. To the eighth interrogatory. I don't know any thing more.

JAMES McCURLEY.

Subscribed before

LEVIN GALE, *Commissioner*.

I, LEVIN GALE, a Commissioner, named in the annexed Commission, do further certify, that the said James McCurley was by me first carefully examined, and cautioned, and duly sworn, to testify the whole truth; that he was examined in a place separate and apart from all persons; and that the interrogatories were propounded to him and his answers taken in the order in which they are numbered; and that his deposition was reduced to writing by me, and thereafter subscribed by him in my presence.

I do further certify that the examination of the other witness named in the Commission was not taken by me, because the said witness could not be produced and examined before me until after the fifteenth day of March, in the year eighteen hundred and fifty-four, and I was informed that it was necessary to close the said Commission by that day. And I do further certify that I am not of counsel or attorney for either of the parties to the said cause, and that I am not interested in the event of the said cause.

Given under my hand and seal this fifteenth day of March, in the year eighteen hundred and fifty-four.

LEVIN GALE. [SEAL.]

UNITED STATES CIRCUIT COURT, }
MASSACHUSETTS DISTRICT. — October Term, 1852. }

ROSS WINANS vs. THE EASTERN RAILROAD COMPANY,

IN EQUITY.

Interrogatories to be addressed to Thomas Davis, John Ferry, Edward Ferry, and William Roberts, all of Baltimore, Maryland, on behalf of the Complainant; also to David Steiner, George Rohrer, Wm. Fairlamb, Gus. V. Allen, Wm. H. McCannon, Wm. Dempsey, Wm. Hughes, Wm. G. Miller, and John D. Wheeler, all of Baltimore.

1. What is your name, age, residence, and occupation? How long have you been so engaged, and where?

2. Were you ever, and during what period, in the service of the Baltimore and Ohio Railroad Company? If yea, what department were you in, and what was your special employment?

3. Do you know what kind of cars were then used on the said road? and, if yea, please state what kind were used, and how you recollect the same.

4. Do you know the Complainant, Ross Winans; and, if yea, whether or not you knew him in connection with said railroad company, and when?

5. If you say you knew said Winans while he was in the employ of the said Railroad Company, please state during what year you so knew him, and what was his occupation upon said road. What opportunity had you for observing his operations?

6. If you say that said Winans was occupied in the planning and

superintending of the construction of *eight-wheel* cars, please state in full all you know relating to the invention of the said eight-wheel car, the course of said Winans' experiment, and all that came under your own observation in relation thereto.

7. If any changes were made in the bodies or running-gear of such eight-wheel cars, please describe the same fully, and state for what purpose they were made, and when.

8. When and where was the first eight-wheel railroad-car used, to your knowledge; and by whom was the same made?

9. Who was the inventor of the said car, and by what name was it called? Give the reasons for your opinion, and state your means of knowledge.

[Objected to, as inquiring a matter of opinion.]

10. Please examine the drawing annexed, and state if it be a correct representation of the said eight-wheel car. If not, specify wherein it differs.

[Objected to, as leading.]

11. If you say that the said car was called the "Columbus," please state if any eight-wheel cars, for passengers, were put on the said Baltimore and Ohio Railroad, after the "Columbus," and before the opening of the Washington Branch Railroad; and please state when said branch was opened.

12. If you say there were other eight-wheel passenger-cars put on the said road as above, give such description of them as you can recollect, stating how they differed from the "Columbus," and from each other; where the draft was applied, and whether they were drawn in trains conducted by you.

13. Who furnished the plans or drawings for, or was considered by you to be the inventor of, said eight-wheel cars? Upon what do you found your opinion or belief?

[Objected to, as inquiring a matter of opinion.]

14. Whether or not were there any cars used on the said railroad, called "Washington cars;" and, if yea, who furnished the plans for their construction, and when were they first put on the said road? What were the said "Washington cars"? Please describe them fully, and state wherein they differed from the "Columbus."

15. When were the first eight-wheel *freight* or *burden-cars* used on said road?

16. What description of cars were used on said railroad, for the transportation of wood, stone, and merchandise, prior to the opening of the said Washington branch of the said road?

C. P. CURTIS, JR., for Complainant.

UNITED STATES CIRCUIT COURT, }
MASSACHUSETTS DISTRICT. — October Term, 1852. }

ROSS WINANS vs. EASTERN RAILROAD COMPANY.

Cross-interrogatories proposed to Thomas Davis, John Ferry, Edward Ferry, and William Roberts, David Steiner, George Rohrer, William Fairlamb, Gus. V. Allen, William H. McCannon, William Dempsey, William Hughes, William G. Miller, and John D. Wheeler.

X 1. Are you, or have you ever been, or do you expect to be, in the employ of Ross Winans, or of any person interested in the success of said Winans' patent?

X 2. If, in answer to the seventh interrogatory, you have stated that changes were made in the running part of the eight-wheel cars, will you state *when* said changes were made, on what cars? What was the change made, and who were the men that worked on the trucks, in making these changes?

X 3. If, in answer to the thirteenth interrogatory, you state that Winans furnished any plans or drawings for any eight-wheel car, will you state *what* car or cars you refer to? Also annex to your answer the original drawing or drawings, or plan or plans, which you refer to.

X 4. Are you aware that eight-wheel cars were used for transporting string-pieces on the road, during its construction? — that eight-wheel cars, for carrying cord-wood, were constructed, and transported cord-wood upon the road during the fall and winter of 1830, prior to the building of the car Columbus?

X 5. Are you aware that the car Columbus was originally constructed and run on the road without any railing on top; and that the railing was designed and put upon her several weeks after she had been first put upon the road?

X 6. Are you aware that eight-wheel freight or house-cars, which were drawn by a coupling from the middle of the end of the body, were constructed by Mr. Jacob Rupp? — that such cars were put upon the road prior to the opening of the Washington branch-road?

X 7. Was the "Comet" the last passenger-car which was constructed before the 1st October, 1834, the date of Winans' patent?

X 8. Have you any interest, direct or indirect, in said Winans' patent, or in the success thereof?

X 9. Have you not stated to some person, — and, if so, to whom, — that you did recollect the eight-wheel cars for carrying cord-wood, but could not recollect the precise date when they were so used; but that you believed it to be about 1830 that they were so used, or during that year? Or have you made any part of this statement, or any thing of the same purport?

X 10. Has the copy, or the substance of any of the foregoing direct interrogatories, been shown or stated to you before this examination? If so, when and by whom were they so shown or stated?

WM. WHITING, *Solicitor of Respondent.*

A true copy. Attest,

H. W. FULLER, *Clerk.*

Deposition taken on the 23d and 24th January, A. D. 1854, as follows:—

JOHN D. WHEELER, a witness named in said Commission, being duly sworn and carefully examined on the interrogatories and cross-interrogatories addressed and propounded to him, and annexed to said Commission, and being examined on behalf of the Complainant in the said cause, deposes and says as follows:—

(For Interrogatories, see p. 351.)

1. To the first interrogatory on the part of the Complainant, he says: My name is John D. Wheeler; I am in my forty-ninth year; reside in the city of Baltimore, and always have; and am a clerk of the Baltimore and Ohio Railroad Company, and have been since last summer, previous to which I was a supervisor of cars on said road.

2. To the second interrogatory, he says: In April, 1832, I entered the service of the said railroad company; and, from that period to 1839, I was supervisor of cars. In 1839, I left the service of said company, and returned to it in 1847; and, from the latter date until last summer, I was supervisor of cars on said road. I have been acting in the capacity of clerk since last summer. While supervisor, my duty was to attend to the receipt and delivery of goods and merchandise from the cars; and I knew all the freight or burthen-cars on the road.

3. To the third interrogatory, he says: When I first went on said road, we used nothing but four-wheel cars, and this continued for about three years; and, in the latter part of 1834, or beginning of 1835, they commenced building the eight-wheel house burthen-car. All this while they had one or more eight-wheel passenger-cars; but all the cars, burthen and passengers, except these, were four-wheel cars. When I entered the service of the company, there was one eight-wheel passenger-car, called the Columbus; afterwards another was built, called the Dromedary.

4. To the fourth interrogatory, he says: I knew said Winans, and have known him since I went first on said road. Said Winans had some connection with said road for some years after I went there.

5. To the fifth interrogatory, he says: I believe said Winans was building engines for the company, and also cars for said company, I believe. My duties did not afford me an opportunity of observing his operations, or ascertaining what were his particular duties. My duty was among the cars (burthen-cars); that is, taking them from Mount Clare Depot into the city, for distribution to the consignees.

6. To the sixth interrogatory, he says: I could not say any thing about the matters herein contained, as nothing came under my actual knowledge.

7. To the seventh interrogatory, he says: I have no knowledge of changes in the bodies, or running of the two cars I have spoken of.

8. To the eighth interrogatory, he says: When I came on said

road, the Columbus, an eight-wheel passenger-car, was there; and this was the first one used to my knowledge. I do not know by whom said car was made.

9. To the ninth interrogatory, he says: I cannot tell who was the inventor of said car.

10. To the tenth interrogatory, he says: From my present recollection of the Columbus, said drawing seems to me to be a correct representation.

11. To the eleventh interrogatory, he says: The Dromedary was put on after the Columbus; she was a car for passengers. I recollect that there was another eight-wheel passenger-car, and it appears to me that she was drawn by a different mode. I think she was drawn by the body. This was before the opening of the Washington Branch Railroad, which took place in 1835, I believe.

12. To the twelfth interrogatory, he says: The Winchester was drawn by the body, and the two others by the perch; this is all the difference between them that I remember. I was supervisor of the burthen-cars, and had nothing to do with the passenger-cars.

13. To the thirteenth interrogatory, he says: I do not know who furnished the plans or drawings, or who was the inventor, and have no present impression as to who was the inventor.

14. To the fourteenth interrogatory, he says: There were used on said railroad, cars called the Washington cars. I do not know who furnished the plans for their construction. They were put on the road at the opening of the Washington branch; they were made for that branch of the road. The difference between them and the Columbus was, they were drawn by the body, and the Columbus by the perch. They had a platform at each end, and the Columbus none; and they carried no passengers on top. This is all I know about it.

15. To the fifteenth interrogatory, he answers: Eight-wheel freight or burthen-cars were first used on said road, I think, in eighteen hundred and thirty-four. My impression is that it was previous, but very shortly before the opening of the Washington branch.

16. To the sixteenth interrogatory, he says: Four-wheel cars were used on said railroad for the transportation of wood, stone, and merchandise, up to the time of the building and completion of the eight-wheel burthen-cars, which it seems to me was shortly before the opening of the Washington branch.

CROSS-EXAMINED.

(*For Cross-interrogatories, see p. 353.*)

X 1. To the first cross-interrogatory, he says: No.

X 2. To the second cross-interrogatory, he says: I know not.

X 3. To the third cross-interrogatory, he says: I know not.

X 4. To the fourth cross-interrogatory, he says: I know nothing of eight-wheel cars for carrying cord-wood. After I came on the road, string-pieces and long timber were carried on two common platform cars, with a bolster on each, and a coupling between the cars from

perch to perch, of the length requisite to carry the load. There was a hole made in each end of the coupling to go over the perch-pin.

X 5. To the fifth cross-interrogatory, he says: I have no recollection on the subject.

X 6. To the sixth cross-interrogatory, he says: I have no knowledge.

X 7. To the seventh cross-interrogatory, he says: I do not know.

X 8. To the eighth cross-interrogatory, he says: I have no interest in any way.

X 9. To the ninth cross-interrogatory, he says: I never made any such statement.

X 10. To the tenth cross-interrogatory, he says: I never saw said interrogatories, or heard their substance before my examination here.

JOHN D. WHEELER.

Deposition taken on the 27th, 28th, and 29th of January, A. D. 1854, as follows:—

JOHN FERRY, a witness named in said Commission, being duly sworn and carefully examined on the interrogatories and cross-interrogatories addressed and propounded to him, and annexed to said Commission, and being examined on behalf of the Complainant in the said cause, deposes and says as follows:—

(*For Interrogatories, see p. 351.*)

1. To the first interrogatory on the part of the Complainant, he says: My name is John Ferry; I am fifty-one years of age; reside in the city of Baltimore; and I am a commission and grocery merchant, in which business I have been engaged, in said city, since 1838; previous to which latter date, I was employed for many years on the Baltimore and Ohio Railroad.

2. To the second interrogatory, he says: I was in the employment of the said Baltimore and Ohio Railroad Company from the commencement of the first work on said road, in eighteen hundred and twenty-seven, I think, up to the year eighteen hundred and thirty-seven. I was first employed in delivering granite for the construction of the road, and then iron; and I continued in the construction-department of said road until it was completed to Fredericktown, Maryland; and this was my special employment up to that time, that is to say, up to eighteen hundred and thirty-one. In eighteen hundred and thirty-one, I was appointed a conductor in the tonnage-department; and, in this capacity, with an occasional transfer to the passenger-department or trains, I continued until I left, in eighteen hundred and thirty-seven, as previously stated by me.

3. To the third interrogatory he says: The four-wheel car, for passengers and tonnage or freight, was altogether used on said road,

until the summer of eighteen hundred and thirty-one, when an eight-wheel passenger-car, called the Columbus, was placed on the road. I was appointed conductor in the winter of 1830-1831, and in the following summer the Columbus was first placed on the road. My recollection is distinct, because I was always on or about the road; and from the said winter I was a conductor of the burthen or freight-cars, and knew all of them, as well as all the passenger-cars.

4. To the fourth interrogatory, he says: I know the said Ross Winans, and became acquainted with him when I was appointed a conductor in the tonnage-department of said railroad. Said Winans was then, and for some years afterwards, employed on the said railroad.

5. To the fifth interrogatory, he says: I knew said Winans as a superior officer in the machine and construction of cars department, from 1831, and for several years thereafter. I cannot state particularly the nature of his employment, further than I have above, and that he was about the workshops actually superintending the construction of cars and machinery, and giving a personal superintendence over the cars on the road; and I remember that, when any accident occurred or repairs were wanted, we called the attention of said Winans to them, through Mr. Glenn, who was in one of the workshops. My duties were in the tonnage-department, and I am therefore unable to answer this question more fully.

6. To the sixth interrogatory, he says: I always understood that said Winans was the inventor of the first and other eight-wheel passenger-cars, and also of the changes made in them; and of this I had no doubt, nor have I now any doubt, because said Winans was constantly on the road, witnessing and inquiring about their operations on the said road; and on such occasions I have heard him give directions for alterations. This was all that came under my observation, as my duties were on the road, and not in the workshops. It was conceded by every one, that he was the inventor of said eight-wheel passenger-cars.

7. To the seventh interrogatory, he answers: A change was made in the Comet, so as to bring her bodies, which hung between the trucks, on a line with the trucks. I cannot at this time remember any other changes.

8. To the eighth interrogatory, he says: The first eight-wheel railroad-car I ever knew or saw was the Columbus. She was used on the Baltimore and Ohio Railroad, and was put on said road a few months after I became a conductor. She was made at the workshops of the said railroad company.

9. To the ninth interrogatory, he says: The said car was called the Columbus; and Ross Winans, I always understood and believed, was the inventor. No one else was ever spoken of, or claimed the invention, to my knowledge. Further I know not.

10. To the tenth interrogatory, he says: I have examined the said drawing, and I believe it to be a correct representation of the said eight-wheel passenger-car Columbus.

11. To the eleventh interrogatory, he says: Three other eight-

wheel cars for passengers were put on the said railroad after the Columbus, and before the Washington branch of said railroad was opened, which took place in the summer of 1835.

12. To the twelfth interrogatory, he says: The first eight-wheel passenger-car, after the Columbus, which was put on said road, was called the Winchester. She differed from the Columbus in being drawn by the body and not by the perch, as the Columbus was, and as were also the other two cars hereinafter mentioned. Her wheels were closer together than those of the Columbus. The Columbus had one body, and the Winchester three coach-bodies. The next car put on said railroad was called the Dromedary. She had four bodies, entered by separate doors from the sides; and her body hung low between the wheels, which were closer than those of the Columbus. The fourth car was called the Comet, and she had five bodies, the three centre ones hanging between the trucks. The Columbus, Dromedary, and Comet were drawn by the perch, and the Winchester was drawn by the body. These are the only differences between them that I recollect. The three last-named cars were, I well remember, put on the road in quick succession, and were on the said railroad, and in use, at least one year before the Washington branch of said railroad was opened for travel. The Winchester was put on the road some months before either the Dromedary or Comet. The Columbus and the Winchester were frequently drawn in trains conducted by me.

13. To the thirteenth interrogatory, he says: I do not know who furnished the plans or drawings for said eight-wheel cars. I know nothing more about the inventor than I have already stated in my previous examination.

14. To the fourteenth interrogatory, he says: There were cars used on the said railroad, called Washington cars. I do not know who furnished the plans for their construction. They were first put on the said railroad in the summer of 1835, when said Washington Branch Railroad was opened. They differed from the Columbus in the following particulars: The said Washington cars were entered at each end by a door in the centre, from a platform projecting several feet beyond the body. The seats were ranged at each side of a passage through the centre of the car, from door to door. They had no place for passengers on the top of the car. The platforms were part of the car-body, and the said cars were drawn by the body from the centre of the end of the platform. The wheels of the truck were placed very close together.

15. To the fifteenth interrogatory, he says: The first eight-wheel freight or burden-cars were first used about the time of opening the Washington branch of the said railroad. This is as near as I can recollect.

16. To the sixteenth interrogatory, he says: Four-wheel cars exclusively were used on said railroad for the transportation of wood, stone, and merchandise, prior to the opening of the Washington branch of said railroad.

(For Cross-interrogatories, see p. 353.)

X 1. To the first cross-interrogatory, he says: No.

X 2. To the second cross-interrogatory, he says: I have not so stated.

X 3. To the third cross-interrogatory, he says: I have not so stated.

X 4. To the fourth cross-interrogatory, he says: I have no such knowledge. String pieces were loaded on two common platform-cars, with a bolster on each platform-car, like the common wagon-bolster, on which the string-pieces were laid; and the two cars were coupled by a piece of scantling, with a hole bored in the centre of each end, through which the pins of the platform-cars were passed.

X 5. To the fifth cross-interrogatory, he says: I do not remember, and have no knowledge.

X 6. To the sixth cross-interrogatory, he says: I have no knowledge whatever of the matters inquired of in this interrogatory. I never knew said Rupp, and never saw such cars.

X 7. To the seventh cross-interrogatory, he says: The Comet was the last passenger-car which was constructed before the first of October, 1834.

X 8. To the eighth cross-interrogatory, he says: I have no interest whatever in said Winans' patent, or its success.

X 9. To the ninth cross-interrogatory, he says: I have never made any such statement, or any thing of the same purport.

X 10. To the tenth cross-interrogatory, he says: I have not seen a copy, nor has the substance of any of the foregoing direct interrogatories been shown or stated to me before my examination.

JOHN FERRY.

THOMAS DAVIS, a witness named in said Commission, being duly sworn and carefully examined on the interrogatories and cross-interrogatories addressed and propounded to him, and annexed to said Commission, and being examined on behalf of the Complainant in the said cause, deposes and says as follows:—

(For Interrogatories, see p. 351.)

1. To the first interrogatory on the part of the Complainant, he says: My name is Thomas Davis; I am fifty-one years of age; reside in the city of Baltimore; and at present, and for the last eleven years, have kept, in said city, a boot and shoe store.

2. To the second interrogatory, he says: In February, eighteen hundred and thirty-one, I went into the service of the said Baltimore and Ohio Railroad Company, as conductor of transportation or burthen-cars, and continued in the said service of said company for six years and nine months, as such conductor of burthen-cars.

3. To the third interrogatory, he says: In 1831, when I first went there, and for between three and four years thereafter, all the burthen-cars were four-wheel cars, as were also all the passenger-cars, except four passenger-cars which were built within that period, and were eight-wheel cars. I recollect this distinctly, because as conductor of the burthen, and occasionally as conductor of the passenger-cars, in the absence of the conductor, I was always on the road, and saw and became familiar with the cars on it. After the above-mentioned four eight-wheel passenger-cars were made, had been tried and altered, they began to make eight-wheel passenger and burthen-cars; and they were used on the Washington branch of said road, and afterwards on all the road, and as fast as they could be made.

4. To the fourth interrogatory, he says: I knew the said Complainant, Ross Winans; he was connected with and in the employ of said company, during the whole time I was there.

5. To the fifth interrogatory, he says: I became personally acquainted with said Winans very soon after I entered the service of said company; and he was then and thereafter engaged in directing the machine-shops, and the making of the iron-work and running-gear of the cars built at the company's shops. I had frequent and constant opportunities of seeing him, and observing his operations.

6. To the sixth interrogatory, he says: The first eight-wheel car built on said road was a passenger-car, called the Columbus; and after her three others were built, — the Winchester, Dromedary, and Comet. Mr. Winans was considered the inventor of the said eight-wheel cars. Said cars, after being put on the road, were altered and improved, and were used on the road.

7. To the seventh interrogatory, he says: I recollect that several changes were made in the running-gear of said cars, to get round the curves and pass through the switches. I remember that the wheels were brought closer together, and that the Columbus was drawn by the perch, and this was altered, and the draft was made from the body; and these changes were eventually made in the whole four of them. In the Columbus it was discovered that there was a tendency to run off the track, and drawing, as she did, by the perch; and, with the wheels so far apart as they were when she was put on the road, this would occur at the switches when passing from one track to the other. This was altered, the wheels were placed near together, and she was drawn by the body; and this overcame the difficulty. In the case of the Dromedary, I recollect that her bodies were placed on a straight line, as she could not pass the inclined plane, owing to the bodies between the wheels being too near the track. I cannot now state the particular changes made; but others were made, and all of them, as I always understood, under the direction of Mr. Winans.

8. To the eighth interrogatory, he says: The first eight-wheel railroad-car that I have any knowledge of was the Columbus, and she was used on the Baltimore and Ohio Railroad. Said car was made at the shops of said railroad company, and under the direction of Mr. Winans, as I believe, and so far as I have any knowledge on the subject.

9. To the ninth interrogatory, he says: Said car was, as I have before stated, called the Columbus, and Ross Winans was considered the inventor. He was universally believed to be the inventor at the time, so far as I have any knowledge; farther than this I cannot answer. My opinion was formed from the invention being, at the time, conceded to him.

10. To the tenth interrogatory, he says: I have examined the said drawing, and it is a correct representation of the Columbus, when first put on the road.

11. To the eleventh interrogatory, he says: After the Columbus, three other eight-wheel cars for passengers were put on the said road, whose names I have before stated. This was done before the opening of the Washington Branch Railroad. Said road was opened some time in 1835.

12. To the twelfth interrogatory, he says: I am not able to give a description how said cars differed from the Columbus, and from each other, so long a time has elapsed; but I recollect they all differed in the bodies. The Winchester, I am satisfied, was drawn by the body; and, after the alterations were made in them, they all were drawn by the body; and occasionally these cars were in the trains conducted by me, on some occasions when I was temporarily transferred from the burthen-train.

13. To the thirteenth interrogatory, he says: I do not know who furnished said plans or drawings. I have stated already all that I know about the inventor of said eight-wheel cars.

14. To the fourteenth interrogatory, he says: There were cars used on the said railroad called Washington cars. I do not know who furnished the plans for their construction; but, as far as I had any knowledge, and according to the general reputation and belief, said Winans did. Said cars were put on the said road at the opening of the Washington branch thereof, and used on said branch. Said cars were eight-wheel passenger-cars. The principal difference between them and the Columbus is, that they had no railing or place for passengers on top. They had a platform extended at each end beyond the body, which they were drawn by (the body); and you entered them from the centre of this platform at each end; and there was a passage through the centre. This was the general construction of the bodies. In the running-gear the wheels were put nearer together to enable them to overcome the curves and switches, and they were all drawn by the body.

15. To the fifteenth interrogatory, he says: The first eight-wheel burthen-cars were used in 1835 or beginning of 1836; I cannot remember the precise date, but it was after the Washington Branch Railroad went into operation, or just about that time.

16. To the sixteenth interrogatory, he says: Four-wheel cars were used on said railroad for the transportation of wood, stone, and merchandise, prior to the opening of the Washington branch.

CROSS-EXAMINED.

(*For Cross-interrogatories, see p. 353.*)

X 1. To the first cross-interrogatory, he says: No, I am not, have never been, nor do I ever expect to be, in the employ of Ross Winans, or of any person, that I know of, who is interested in the success of said Winans' patent.

X 2. To the second cross-interrogatory, he says: I am unable at this late date to say when said changes were made, or on what cars, further than I have already stated, or more particularly the changes made; nor do I now remember the men that worked on the trucks in making these changes. I remember distinctly that the changes were made of which I have spoken, in regard to the Columbus; and I know that, if any of the others had the same objections, they were altered.

X 3. To the third cross-interrogatory, he says: I have not so stated in my said answer.

X 4. To the fourth cross-interrogatory, he says: I have seen string-pieces transported on said road on two platform-cars. The timber was simply laid on them, and the cars were coupled together with a piece of scantling. I have no further knowledge of the matters herein inquired of.

X 5. To the fifth cross-interrogatory he says: I cannot say. I know the Columbus had a railing, but whether at first or not I cannot remember.

X 6. To the sixth cross-interrogatory, he says: I have no knowledge of any such cars.

X 7. To the seventh cross-interrogatory, he says: I do not know. I do not remember the order of time in which they were built.

X 8. To the eighth cross-interrogatory, he says: I have no interest of any kind in said Winans' patent, or its success.

X 9. To the ninth cross-interrogatory, he says: I have never made any such statement as is contained in this question.

X 10. To the tenth cross-interrogatory, he says: No; I have never seen the copy, or had the substance of said direct interrogatories communicated to me until they were read to me by the Commissioner on my examination.

THOMAS DAVIS.

WILLIAM FAIRBANK, a witness named in the said Commission, being duly sworn and carefully examined on the interrogatories and cross-interrogatories, deposes and says as follows, to wit:—

(*For Interrogatories, see p. 351.*)

1. To the first interrogatory on the part of the Complainant, he says: My name is William Fairbank; I am fifty-seven years of age; and at present, and since July, 1850, I have been engaged as keeper of the bridge on the Baltimore and Washington Turnpike; and reside in Baltimore County.

2. To the second interrogatory, he says: I cannot remember the date, by year or day, when I entered the service of the said Baltimore and Ohio Railroad Company, but it was when the said road was opened to Ellicott's Mills; and I remained in said service until the year eighteen hundred and fifty, a period of about twenty years. My duties and employment were as conductor on said road, principally as conductor of burthen-trains.

3. To the third interrogatory, he says: When I first entered the service of said company, we used none but four-wheel cars, and until a car called the Columbus was built; and she was the first car with eight wheels built on the road.

4. To the fourth interrogatory, he says: I know said Winans, and have known him for twenty odd years. I first knew him in the employ of the said railroad company, but whether immediately on my going into said service or not, I cannot now remember; but, if he was not there when I entered, he came there immediately thereafter.

5. To the fifth interrogatory, he says: I cannot state positively the year in which I first knew said Winans, but it was a year or two before the Columbus was put on the road. He was the master of machinery, and attended to making plans for the cars. When I would come in from my work, I would go about the shops a great deal, and I would see him in them giving directions.

6. To the sixth interrogatory, he says: All I can say in answer to this question is, that eight-wheel cars were built on the said road, and that the Columbus was the first one of them; and that these eight-wheel cars were stated on the said road to be, and were by every one, as far as I ever heard, believed to be, the invention of Ross Winans.

7. To the seventh interrogatory, he says: I know that, after the Columbus was built, three other eight-wheel passenger-cars were made, and I have a distinct recollection that alterations and changes were made about them. They were always making alterations about them; but what these alterations were I cannot remember.

8. To the eighth interrogatory, he says: The first eight-wheel railroad-car that I knew of was used on the Baltimore and Ohio Railroad, from Ellicott's Mills to Baltimore. The said car was made in the shops of the said railroad company. Oliver Cromwell, Francis Gatch (now dead), and Michael Glenn, worked on said car. I do not remember any other, but there were others.

9. To the ninth interrogatory, he says: The said car was called the Columbus, and Ross Winans always had the name of being the inventor of said car. Every body in said company at the time said so.

10. To the tenth interrogatory, he says: I have examined the said drawing, and believe the same to be a correct representation of the said eight-wheel car. That representation is the Columbus.

11. To the eleventh interrogatory, he says: Three other eight-wheel passenger-cars were put on said road after the Columbus, and before the Washington Branch Railroad was opened. The first was named the Winchester, then the Dromedary, and then the Comet. Said branch was opened in 1835.

12. To the twelfth interrogatory, he says: The draft of the Columbus and the Dromedary was from the running-gears, and in the others from the body; and they were all altered so as to make them draw from the body. It was much the best plan, as by the truck they were more apt to run off the track. The said cars, I recollect, differed in the form and construction of the bodies from each other, and also from the Columbus; but I cannot particularize the difference. They were not drawn in my trains. I was a burthen-conductor; but on Sundays I frequently went out in them.

13. To the thirteenth interrogatory, he says: All I have to go by is report; and everybody said that Winans was the man who furnished the plans, and was the inventor.

14. To the fourteenth interrogatory, he says: Cars called the Washington cars were used on the said railroad, and were put on the said road when the Washington branch was opened in 1835. Winans, I suppose, furnished the plans for their construction; he was considered the man, and they were spoken of on the road as his cars. I cannot describe the difference between them and the Columbus; but they were a much better car. I do recollect that they all pulled by the body, that they had no place for passengers on top, and that the seats were ranged on each side of the car, with a passage in the middle; and you entered by a door at the ends of the car, from a platform at each end. The running-gear was pretty near under the end of each car, and the wheels were placed closer together than in the Columbus. I do not remember any other difference; and I can best describe them by saying that they were like the cars now in use on said road, except that the present cars are bigger.

15. To the fifteenth interrogatory, he says: I do not think that eight-wheel burden-cars were used on said road until after the Washington road was opened.

16. To the sixteenth interrogatory, he says: Four-wheel cars were used on said railroad for the transportation of wood, stone, and merchandise, prior to the opening of the Washington branch of said road. In transporting wood, they sometimes coupled two common platform stone cars by a scantling from perch to perch, the scantling having a hole at each end for the perch-pin. They put a common wagon-bolster on each car, on which were laid two long timbers with uprights at the end to hold the wood.

CROSS-EXAMINED.

(For Cross-interrogatories, see p. 353.)

X 1. To the first cross-interrogatory, he says: No, I am not, have never been, nor do I expect ever to be, in said Winans' employ, or of any person interested in his patent.

X 2. To the second cross-interrogatory, he says: I only know that changes were made; but, as I have said in my answer to said seventh interrogatory, I do not remember them. Nor do I know who worked on said changes.

X 3. To the third cross-interrogatory, he says: I cannot answer this interrogatory more fully than it is answered in the said answer therein referred to. I have no knowledge except from general report, and have no drawings in my possession.

X 4. To the fourth cross-interrogatory, he says: I am not aware, nor do I know, that eight-wheel cars were used for transporting string-pieces on the road during its construction; that is to say, what I call eight-wheel cars, and I mean such as were put on the road about the opening of the Washington branch, and as are now used as burthen or freight-cars. I am aware that, in transporting string-pieces and long timber, two common stone platform-cars were used. A bolster was placed on each platform-car, and the string-pieces and long timber were placed on the bolsters; and a coupling from perch to perch of the platform-cars was used or made by boring a hole in each end of a piece of scantling, and passing the perch-pins through it. Cord-wood was also carried on two such cars, with a common wagon-bolster on each, and two pieces of long timber laid on the bolsters; these timbers had uprights or standards in the end to pile the wood between, and keep it from falling off. These were temporary cars, and, when not wanted for either of the foregoing purposes, were taken apart and used separately. I cannot fix the time when I first saw said two platform-cars thus used, but I think it was about the winter of 1831-1832.

X 5. To the fifth cross-interrogatory, he says: I do not recollect whether the railing was put up first or afterwards.

X 6. To the sixth cross-interrogatory, he says: I have no knowledge whatever.

X 7. To the seventh cross-interrogatory, he says: The Comet was the last passenger-car built before the Washington cars; but, as to the date, I have no knowledge.

X 8. To the eighth cross-interrogatory, he says: No; I have no interest at all, direct or indirect.

X 9. To the ninth cross-interrogatory, he says: I have never made any statement to any one on the subject inquired of, until this day, on this my examination.

X 10. To the tenth cross-interrogatory, he says: No; I never heard of or saw said interrogatories, before my examination this day.

WILLIAM FAIRBANK.

Deposition taken on the 21st and 23d January, A. D. 1854, as follows:—

WILLIAM DEMPSEY, a witness named in said Commission, being duly sworn and carefully examined on the interrogatories and cross-interrogatories addressed and propounded to him, and annexed to said Commission, and being examined on behalf of the Complainant in the said cause, deposes and says as follows:—

(*For Interrogatories, see p. 351.*)

1. To the first interrogatory on the part of the Complainant, he says: My name is William Dempsey; I am forty-two years of age; am a saddle and harness maker, and coach trimmer, by trade; and reside in the city of Baltimore, where for twenty-five years I have carried on or pursued said business.

2. To the second interrogatory, he says: I went in the service of the said railroad company, in January, eighteen hundred and thirty-one; I think it was in January, it was certainly very early in that year. I remained there, off and on, until the end of 1834. I was always doing more or less during said period for said company; but I did my work by the piece, and when that was done I left until called for again. I worked in the trimming department. In 1834, I think it was; and after I had left as a trimmer, I went on said road as a conductor of a burthen-train, and remained three or four months.

3. To the third interrogatory, he says: All the cars used on said road were four-wheeled cars, until the car Columbus was built; and after her three others of eight wheels were built while I was on the road. I trimmed them all; they were eight-wheel cars for passengers; and the three last were called the Winchester, Dromedary, and Comet.

4. To the fourth interrogatory, he says: I know the Complainant, Ross Winans. He was connected with said railroad, when I went there, and I left him there.

5. To the fifth interrogatory, he says: Said Winans seemed to be attending to the construction of the cars and machinery on the road. I often saw him in the shops, two and three times a day.

6. To the sixth interrogatory, he says: I thought that said Winans was the planner of the eight-wheel car Columbus, and of the three others also. This was my opinion at the time. He was generally understood to be the inventor, and was about the shops superintending their construction. I used to see him sometimes as often as once or twice a day, sometimes with his drawings and plans; and several times I had an opportunity of looking at them.

7. To the seventh interrogatory, he says: I know there were changes made in the said eight-wheel car; but I do not recollect them, and therefore cannot describe them, or the purpose for which they were made.

8. To the eighth interrogatory, he says: The first eight-wheel railroad car that I know of was the Columbus. I cannot say when she was first used, but I remember that a great many went out in her. The said car was made at the workshops of the Baltimore and Ohio Railroad Company.

9. To the ninth interrogatory, he says: So far as I know about the inventor of the car, Mr. Winans was. About the shops, it was considered his invention. Further I cannot answer.

10. To the tenth interrogatory, he answers: I have examined the said drawing; and, from my recollection of the Columbus, I would say it was a correct representation.

11. To the eleventh interrogatory, he says: As I have already stated, three eight-wheel passenger-cars were put on the road after the Columbus, and before the opening of the Washington branch. I do not remember when said branch-railroad was opened.

12. To the twelfth interrogatory, he says: I am unable to answer this interrogatory.

13. To the thirteenth interrogatory, he says: I considered Ross Winans the inventor of said eight-wheel cars. I thought he furnished the plans and drawings, because I saw them in his hands when said cars were being built. I considered him the inventor because of his plans and drawings, and his giving directions to the workmen about them, and because everybody else considered him the inventor.

14. To the fourteenth interrogatory, he says: There were cars used on said railroad called Washington cars. I suppose Winans furnished the plans as I saw the plans. Said plans seemed to be after the plans of the other eight-wheel cars. I cannot describe them, or state the difference between them and the Columbus. I never examined them so closely.

15. To the fifteenth interrogatory, he says: I do not now recollect.

16. To the sixteenth interrogatory, he says: As well as I can recollect, four-wheel cars were used altogether for the transportation of wood, stone, and merchandise, prior to the opening of the Washington branch of said railroad.

CROSS-EXAMINED.

(For Cross-interrogatories, see p. 353.)

X 1. To the first cross-interrogatory, he says: No.

X 2. To the second cross-interrogatory, he says: I am wholly unable to answer this question. All that I remember is, that some changes were made; but when made, or any thing else about them, I do not know.

X 3. To the third cross-interrogatory, he says: I think I saw the drawings of the four first eight-wheel cars in Ross Winans' hands. I have not said original drawings, and never had them.

X 4. To the fourth cross-interrogatory, he says: I have no knowledge or present recollection of any such cars as are mentioned in the interrogatory.

X 5. To the fifth cross-interrogatory, he says: I recollect that said car Columbus was originally constructed and run on the road without any railing on top, and that afterwards (how long after I do not know) a railing was put on her. When the railing was first designed, I do not know.

X 6. To the sixth cross-interrogatory, he says: I have no knowledge whatever of any such cars.

X 7. To the seventh cross-interrogatory, he says: I think she, the Comet, was the last.

X 8. To the eighth cross-interrogatory, he says: I have no interest in Winans' patent, or the success thereof.

X 9. To the ninth cross-interrogatory, he says: I have never made any such statement.

X 10. To the tenth cross-interrogatory, he says: I never saw or heard of said interrogatories, until read to me by the Commissioner this morning, on my examination before him.

WILLIAM DEMPSEY.

EDWARD FERRY, being produced this tenth day of March, A. D. 1854, as a witness on the behalf of the Plaintiff in this cause, and being carefully cautioned and sworn to tell the whole truth and nothing but the truth, deposeseth, in answer to the interrogatories exhibited to him on behalf of said Plaintiff, as follows:—

(*For Interrogatories, see p. 351.*)

1. To the first interrogatory. My name is Edward Ferry; I am between forty-two and forty-three years of age; I reside in Baltimore, and am now in the United States mail-service as route-agent.

2. To the second interrogatory. I entered the service of the Baltimore and Ohio Railroad Company in March, 1832; I was in the transportation-department as burden-driver.

3. To the third interrogatory. Four-wheeled cars were used as burden-cars, and also as passenger-cars; but there were, besides these, eight-wheeled passenger-cars, to wit, the Columbus, the Dromedary, the Winchester, and the Comet. He recollects them because he drove them with horse-power.

4. To the fourth interrogatory. I do know Ross Winans, the Complainant; Deponent knew him in connection with the said railroad company when he first went there.

5. To the fifth interrogatory. As I before stated, I knew said Winans was in the employ of the said company, when I first went there in March, 1832. Can't say positively what his occupation was on said road.

6. To the sixth interrogatory. I have no knowledge.

7. To the seventh interrogatory. There were changes made in the bodies and running-gear of the eight-wheeled passenger-cars; thinks it was in the year 1834, when they made them for the Washington branch. I cannot describe the changes made, nor can I state for what purpose they were made.

8. To the eighth interrogatory. The first eight-wheeled car that I ever saw was the passenger-car Columbus. It was used between Baltimore and Ellicott's mills, on the Baltimore and Ohio Railroad, in the year 1832.

9. To the ninth interrogatory. I don't know who was the inventor; it was called the Columbus.

10. To the tenth interrogatory. I have examined the drawing

annexed of the Columbus, and it appears to me to be a correct representation of the said eight-wheel car.

11. To the eleventh interrogatory. There were eight-wheeled passenger-cars put on the said road after the Columbus, and before the opening of the Washington Branch Railroad, to wit, the Dromedary, the Winchester, and the Comet. I don't recollect when the Washington Branch was opened.

12. To the twelfth interrogatory. The Dromedary hung low in the middle; I don't recollect the construction of the Comet; the Winchester had several carriage-bodies attached, and was drawn by the body. I don't now recollect if the Dromedary was drawn by the body or the perch. The Columbus was drawn by the perch. The Columbus, the Dromedary, and the Winchester, were drawn in trains conducted by me.

13. To the thirteenth interrogatory. I don't know who furnished the plans or drawings for the eight-wheel cars; I considered him to be the inventor of said eight-wheel cars. My opinion is founded on the fact, that everybody connected with the railroad considered said Ross Winans to be the inventor.

14. To the fourteenth interrogatory. I have no recollection of any cars being used on the Baltimore and Ohio, then called "Washington cars."

15. To the fifteenth interrogatory. I cannot state at what time the first eight-wheel freight or burden-cars were used on said road.

16. To the sixteenth interrogatory. The cars used on said railroad for the transportation of wood and stone, prior to the opening of the Washington branch of said road, were platform-cars, with bolsters, timbers, standards, and so forth.

To the cross-interrogatories exhibited to him on the part of Defendants, he deposes as follows:—

(For Cross-interrogatories, see p. 353.)

X 1. To the first cross-interrogatory. I am not, I have never been, nor do I expect to be, in the employ of Ross Winans, or of any person interested in the success of said Winans' patent.

X 2. To the second cross-interrogatory. I do not know when said changes were made, or on what cars, nor what was the change made, nor the men who worked on the trucks in making these changes.

X 3. To the third cross-interrogatory. I did not state in my answer to the thirteenth interrogatory, that Winans furnished any plans or drawings: on the contrary, I said I did not know who furnished them.

X 4. To the fourth cross-interrogatory. I have no knowledge, as I did not enter the service of the company till the year 1832.

X 5. To the fifth cross-interrogatory. I have no knowledge of the matters inquired of in this interrogatory.

X 6. To the sixth cross-interrogatory. I have no knowledge of the matters inquired of in this interrogatory.

X 7. To the seventh cross-interrogatory. I don't recollect.

X 8. To the eighth cross-interrogatory. I have not.

X 9. To the ninth cross-interrogatory. I have no recollection of having made any such statement. I did not, as I have before stated, enter the service of the company till the year 1832.

X 10. To the tenth cross-interrogatory. Neither the copy nor the substance of any of the foregoing direct interrogatories has been shown or stated to me before my examination.

EDWARD FERRY.

I, JOHN CARRERE, the Commissioner named in the annexed Commission, do hereby certify that, in pursuance thereof, I did on the days hereinafter set forth, take the respective examinations of William Woodville, Oliver Cromwell, Thomas Davis, William Fairbank, Michael M. Glenn, William Dempsey, John D. Wheeler, and John Ferry, some of the witnesses named in the Commission, in answer to the interrogatories and cross-interrogatories annexed to be propounded to them respectively. And I do further certify, that each of the said persons were by me first carefully examined, and cautioned, and duly sworn, according to law; that they were respectively examined by me separate and apart from all other persons, and from each other; and that the interrogatories and cross-interrogatories were propounded to them in their order; and their respective examinations, hereinbefore set forth, were reduced to writing by me, and thereafter subscribed by the said witnesses respectively, in my presence.

I do also certify that I am not of counsel or attorney for either of the parties to the said cause, and that I am not interested in the event of the said cause.

And, being prevented by sickness from taking the examinations of the other witnesses named in said Commission, I have, by the direction of the Plaintiff, handed the said Commission, together with my foregoing partial return thereof, to John Hannan, Esquire, one of the Commissioners appointed by the Circuit Court of the United States, for the fourth Circuit, in and for the District of Maryland, to be by him completed.

Given under my hand and seal, this twenty-fourth day of February, in the year of our Lord one thousand eight hundred and fifty-four.

JNO. CARRERE, *Commissioner*. [SEAL.]

UNITED STATES CIRCUIT COURT, }
MASSACHUSETTS DISTRICT. — October Term, 1853. }

ROSS WINANS vs. THE EASTERN RAILROAD COMPANY,

IN EQUITY.

Additional Interrogatories to John Ferry, of Baltimore, on behalf of the Complainant.

1. Have you any knowledge respecting the transportation, on said Baltimore and Ohio Railroad, of the horses and carriage of the late Andrew Jackson? If yea, state on what occasion they were so transported, and in what manner; on how many cars; and whether the horses and carriage were both transported on the same or different cars.

2. If you say they were transported on different cars, state how many wheels the car on which the horses were carried, and how many wheels that on which the carriage was transported had, and in what manner they were arranged.

3. What kind of power was used, horse or steam, to draw the car or cars so used?

4. Whether or not did you have any thing to do with the above arrangement? and, if yea, state what it was, and in what manner you were employed, when the subject was brought to your notice.

C. P. CURTIS, JR., *Complainant's Solicitor.*

[The Respondent's counsel object to the foregoing interrogatories, as irrelevant and inadmissible.]

W. WHITING, *Respondent's Solicitor.*

On the 10th day of March, 1854, JOHN FERRY appeared before me. And the said John Ferry, having been by me first carefully examined and cautioned, and duly sworn to testify the whole truth, and examined upon the interrogatories annexed to the Commission, deposed, and answered, and said:—

1. To the first interrogatory. I was the conductor that had charge of the train that met General Jackson at the Relay House. I was directed by the company to take a passenger-car and a locomotive engine, and go to the Relay House to meet the morning train from Washington (which was under the charge of William B. Slack), in which General Jackson was expected to arrive, and to take the General in said car as far as he might think proper to proceed on the railroad. General Jackson came on in the train to the Relay House; and I then took him on the car which I had taken to the Relay House

as far as Sykesville, where he stopped. I left him and the car, and returned to Baltimore with the locomotive alone. This was on the 5th of March, 1836. There were, at this time, no eight-wheel stock-cars; none having up to this time been put in use on to the best of my recollection. The carriage and horses of General Jackson were placed on different cars, and attached to the passenger-car in which the General rode. The horses were put in an open slat-car, having four wheels, and the carriage in the same kind of a car.

2. To the second interrogatory. Each of the cars had but four wheels, and they were arranged as all the stock-cars at that time were, consisting of a platform with standards and slats on both sides, and at one end; at the other end there was a gangway for the horses to come up, which would let down by hinges, and when closed up formed the end of the car.

3. To the third interrogatory. Steam-power.

4. To the fourth interrogatory. I had nothing to do with arranging the cars for carrying the horses and carriage. They were brought up by the train from Washington, and were attached to the passenger-car and locomotive at the Relay House.

JOHN FERRY.

Subscribed before

LEVIN GALE, *Commissioner*.

I, LEVIN GALE, a Commissioner named in the annexed Commission, do certify that the said Oliver Cromwell, Michael M. Glenn, and John Ferry, were by me severally first carefully examined and cautioned and duly sworn to testify the whole truth; that they were by me severally examined in a place separate and apart from each other, and from all persons; that the several interrogatories and cross-interrogatories were propounded to them respectively, and their respective answers taken in the order in which they are herein before set forth; and that their depositions were reduced to writing by me, and thereafter subscribed by them respectively in my presence.

I do further certify, that the examination of the other witnesses named in the Commission was not taken by me, because the said witnesses could not be produced before me and examined until after the fifteenth day of March, in the year eighteen hundred and fifty-four; and I was informed that it was necessary to close the said Commission by that day. And I do further certify, that I am not of counsel or attorney for either of the parties to the said cause, and that I am not interested in the event of the said cause.

Given under my hand and seal, this fifteenth day of March, in the year eighteen hundred and fifty-four.

LEVIN GALE. [SEAL.]

Boston, Jan. 27, 1854.

Dear Sir, — On Friday, February 3d, 1854, the deposition of John Carrere, Esq., of Baltimore, will be taken before Levin Gale, Esq., at Baltimore, at the office of said Carrere, at 10 o'clock, A. M., on behalf of, and to be used by, the Complainant, in the case of R. Winans in Equity *vs.* the Eastern Railroad Company, pending in the Massachusetts District.

[Signed.]

C. P. CURTIS, JR.,
Complainant's Solicitor.

WM. WHITING, Esq.

Boston, Jan. 27, 1854.

I this day left a copy of the above at the office of said Whiting.

M. P. HAMBRIN.

Sworn to, this 27th of January, before me.

C. P. CURTIS, *U. S. Commissioner.*

THE UNITED STATES OF AMERICA, }
DISTRICT OF MARYLAND, TO WIT. }

I, LEVIN GALE, a Commissioner appointed by the Circuit Court of the United States for the Fourth Circuit, in and for the Maryland District, pursuant to the Act of Congress, entitled "An Act for the more convenient taking of affidavits and bail in civil causes depending in the Courts of the United States," do hereby certify, that, on the third day of February, in the year of our Lord one thousand eight hundred and fifty-four, at my office in the city of Baltimore, within the district of Maryland, personally appeared before me, John Carrere, a witness for the Complainant, in a certain cause depending in the Circuit Court of the United States for the District of Massachusetts, wherein Ross Winans is Complainant, and the Eastern Railroad Company is Defendant. And the said John Carrere, being by me first carefully examined and cautioned, and duly sworn according to law, to testify the whole truth, and being examined on behalf of the Complainant, makes oath, deposeth and saith as follows, to wit: —

I am one of the Commissioners appointed by the Circuit Court of the United States for the Fourth Circuit, in and for the District of Maryland, pursuant to the Act of Congress, entitled "An Act for the more convenient taking of affidavit and bail in civil causes depending in the Courts of the United States;" and was one of said Commissioners during the month of June, in the year eighteen hundred and forty-eight, and for many years before that time, and have been ever since.

On the fifth day of June, in the year eighteen hundred and forty-eight, at the instance of the Attorney of the Schenectady and Troy Railroad Company, Conduce Gatch, of the city of Baltimore, was produced before me as a witness on the part of the Defendant in a certain cause depending in the Circuit Court of the United States for the Northern District of New York, wherein Ross Winans was Plaintiff, and the said railroad company was Defendant. And the said Conduce Gatch, having been by me first carefully examined, and cautioned, and duly sworn to testify the whole truth, was examined as a witness on behalf of the Defendant in said cause. And I did then and there take down and reduce to writing, in the presence of the said Conduce Gatch, his evidence and testimony, as delivered to me by him, and thereafter transmitted the same to the said Circuit Court of the United States for the Northern District of New York. That, after the said deposition of the said Conduce Gatch was fully taken and certified, I made, or caused to be made, a copy of the said deposition; and the paper now produced and shown to me, marked in large letters on the first page, "C. Gatch, Defendants," is the copy so made by me. From the first page, inclusive, down to the second line of the sixth page, ending with the words "attached to it," the said copy is in the handwriting of my son, and the whole of the balance of the said copy is in my own handwriting, except the signature at the end thereof, "Conduce Gatch." After said copy was made out, I carefully compared the same with the original, and found the same to be a true, perfect, and literal copy; and had it subscribed by Conduce Gatch in my presence.

Since said copy was made and delivered to the Plaintiff's agent, for whom it was made, various underlinings, marginal figures, erasures, and interlineations, have been made on said copy, all of which are easily distinguishable upon the face of the said copy itself.

JNO. CARRERE.

And I, Levin Gale, a Commissioner as aforesaid, do also certify that the reason for taking the foregoing deposition of John Carrere is that the said John Carrere resides and is in the city of Baltimore, within the district of Maryland, and at a greater distance than one hundred miles from the place of the trial of the aforesaid cause of Winans against the Eastern Railroad Company.

And I do also certify, that the foregoing deposition was taken, pursuant to the annexed notice, at the office of John Carrere, in the city of Baltimore, at 10 o'clock, A. M., of the day named therein. And I do also certify that no attorney or agent attended the taking of the said deposition on behalf of the Defendant in the above cause. And I do also certify, that the Deponent was by me first carefully examined and cautioned, and duly sworn according to law to testify the whole truth; and that the foregoing deposition was then reduced to writing by me, and thereafter subscribed by the said Deponent in my presence. And I do further certify, that I am not of counsel or attorney

for either of the parties to the said cause, and that I am not interested in the event of the said cause.

Given under my hand and seal, at the city of Baltimore, within the district of Maryland, this third day of February, in the year of our Lord one thousand eight hundred and fifty-four.

LEVIN GALE. [SEAL.]

UNITED STATES OF AMERICA.

[L. S.]

THE CIRCUIT COURT OF THE UNITED STATES, WITHIN AND FOR THE MASSACHUSETTS DISTRICT.

MASSACHUSETTS DISTRICT, ss.

To Levin Gale, of Baltimore, in the District of Maryland, Esq., U. S. Commissioner.

KNOW YE, That, reposing confidence in your wisdom, prudence, and fidelity, we have appointed, and by these presents do authorize and empower, you to take the answers to the interrogatories hereto annexed, of John Bennet and Abel Cadwallader, of Baltimore, witnesses to be examined on behalf of the Complainant, and to be used in a certain cause now pending in said Court, wherein Ross Winans is Plaintiff, *vs.* the Eastern Railroad Company, Defendant. And to this end, at certain days to be by you appointed for that purpose, to cause said witnesses, as aforesaid, to be brought before you; and each witness, while present before you, to examine carefully on oath touching the premises. And when you shall have taken the examination as aforesaid, to reduce or cause the same to be reduced to writing, and to be subscribed by each of said witnesses in your presence. And the same, so taken and subscribed, to return, together with this Commission and your doings herein enclosed, sealed, and directed to the Circuit Court aforesaid, holden at Boston, as soon as the same may be executed.

In testimony whereof, we have caused the seal of the said Circuit Court to be hereunto affixed.

Witness, the Honorable Roger B. Taney, at Boston, this twenty-seventh day of January, in the year of our Lord one thousand eight hundred and fifty-four.

H. W. FULLER, *Clerk.*

N. B. — You shall not, except by consent of the parties in writing, permit either party to attend at the taking of the depositions, either himself, or by any attorney or agent, nor to communicate by interrogatories or suggestions with the Deponents, whilst giving their deposition in answer to the interrogatories annexed to this Commission. And you shall take such depositions in a place separate and apart from all other persons, and permit no person to be present during such examination, except the Deponents and yourself, and such disinterested per-

son (if any) as you may think fit to appoint as a clerk, to assist you in reducing the depositions to writing. And you shall put the several interrogatories and cross-interrogatories to the Deponents in their order, and take the answer of the Deponents to each, fully and clearly.

Depositions to be taken on paper of like size with this Commission.

UNITED STATES CIRCUIT COURT, }
MASSACHUSETTS DISTRICT, ss. — May Term, 1853. }

ROSS WINANS *vs.* EASTERN RAILROAD COMPANY,

IN EQUITY.

Interrogatories to John Bennett and Abel Cadwallader, of Baltimore, on behalf of the Complainant.

1. What is your name, age, trade, and place of residence?
2. How were you employed, and where, during the winter of 1830-31?
3. Whether or not had you any thing to do during said winter, and for how long, with preparing cord-wood for sale in Baltimore? If yea, please state how far from said city, and how far from the line of the Baltimore and Ohio Railroad, you were so engaged.
4. Whether or not was any part, and how much, of said cord-wood transported to the said city, on the said railroad? If yea, please state how you came to transport such wood on said road; and also whether or not any cord-wood had previously been carried on said road.
5. How many wheels had each of the railroad-cars used for the transportation of such wood? and please describe the manner in which such cars were arranged, to enable them to carry the said wood.
6. What quantity of wood was regarded as a load for a car, and how many horses were attached to each loaded car, to draw it?
7. How many wheels had the railroad-cars then in use on said road?
8. If you know any other fact of benefit to the Complainant or Defendant in the above suit, please state it fully.

C. P. CURTIS, JR., *Complainant's Solicitor.*

A true copy. Attest,

H. W. FULLER, *Clerk.*

CIRCUIT COURT OF THE UNITED STATES.

WINANS *vs.* EASTERN RAILROAD.

Cross-questions proposed, on the part of the Respondent, to John Bennett and Abel Cadwallader.

1. How many persons, beside yourselves, were in any way concerned in preparing cord-wood for sale, during the time in which you were so concerned? Give the names of each of them, as far as you can recollect, and their places of residence.

2. How many cords of wood did you prepare and send down by the road? How many cords were sent down the road altogether, by all other persons?

3. Can you swear positively that you saw every wood-car that was ever used on said road, for carrying cord-wood, during the winter of 1830 and 1831, and during the preceding summer; that is, the summer and fall of 1830? How many wood-cars can you swear that you saw?

4. Can you positively swear that there was not one single car, having eight wheels, upon said road before July, 1831?

5. When can you say positively that you did see any eight-wheel car on said road?

6. When did you first see any eight-wheel car, or any structure in which eight-wheels were used to transport one load? State the time, place, and circumstances, and how you happened to see it, and how many of such cars or structures you saw.

7. Have you seen or conversed with Ross Winans or Charles D. Gould? if so, when last, and how often?

8. Have you seen or heard the substance of the direct or cross-interrogatories? if so, when and from whom?

9. Will you state any fact known to you, which may be of benefit to the Defendants?

WILLIAM WHITING, *Respondent's Solicitor.*

A true copy. Attest,

H. W. FULLER, *Clerk.*

To the Honorable the Judges of the Circuit Court of the United States, within and for the District of Massachusetts.

I, LEVIN GALE, the Commissioner named in the annexed Commission, do hereby certify, and return to the said Court, that, in pursuance of the annexed Commission, I proceeded on the days hereinafter named to take the depositions of the witnesses named therein, at my office in the city of Baltimore, in a place separate and apart from all other persons, as follows, to wit:—

On the tenth day of February, in the year eighteen hundred and fifty-four, John Bennett appeared before me. And the said John

Bennett, having been by me first carefully examined, and cautioned, and duly sworn to testify the whole truth, and being examined on the interrogatories annexed to the Commission, deposed, answered, and said:—

1. To the first interrogatory. My name is John Bennett. I am in the sixty-third year of my age. I was a millwright by trade, but have not been engaged in that trade since about 1828, when I became a contractor on the Baltimore and Ohio Railroad. I was so engaged for upwards of eighteen months, and have, since that time, been engaged in carrying on the business of excavating earth, keeping teams for hauling, &c. My place of business and residence is at the corner of Warner and Paca streets, in the city of Baltimore.

2. To the second interrogatory. In the fall of 1830, I bought a lot of wood in connection with Oliver Kinsey; and we had it cut and brought to the Baltimore market during the winter following, partly by the Baltimore and Ohio Railroad, and partly by wagons. The lot from which the wood was cut is near the railroad, where the first deep cut occurs, and is about three miles from the city of Baltimore. A part of the wood purchased was brought to the city by the railroad, during the winter of 1830–31; and it was a part of the first cord-wood that was brought to the city by the Baltimore and Ohio Railroad. I think the very first car-load of cord-wood brought to the city of Baltimore, by said railroad, was a part of that purchased by Kinsey and myself. The wood was purchased by Kinsey and myself together, and we were both concerned in cutting and transporting it to Baltimore.

3. To the third interrogatory. I was engaged in cutting and preparing wood for sale during said winter, from the lot mentioned in my answer to the preceding interrogatory. The lot was from about a quarter to half a mile from the Baltimore and Ohio Railroad, and about three miles from the city of Baltimore.

4. To the fourth interrogatory. A portion of the wood cut was transported over the Baltimore and Ohio Railroad, during the winter of 1830–31, to the city of Baltimore. How much was so transported I cannot now state with any accuracy. I suppose from fifty to a hundred cords during said winter. The common roads for wagoning became very muddy and heavy, and the wood was transported over the railroad, because it was considered the cheapest and easiest mode of getting it to market. It was tried as an experiment. To the best of my recollection, there had been no cord-wood transported on said railroad previously. I am certain that no large quantity had been transported on said railroad previously. There may have been a load or two, but no more; and I think there had not been a single load transported over said railroad previous to that transported for Kinsey and myself.

5. To the fifth interrogatory. All the cars on which the wood was transported had four wheels. The cars were constructed in the following manner: There was a platform with four wheels under it; bolsters were placed on the platform, at each end, just over the axles, and were

connected by string-pieces having standards at each end; the wood was piled on the string-pieces, between the standards; the standards were connected at the top by chains, which served the purpose of keeping the standards in their places, and also kept the wood from being thrown off.

6. To the sixth interrogatory. At that time,—that is, during the winter of 1830–31,—the load for a car, according to the best of my recollection, was from a cord to a cord and a half; certainly not more than two cords, but I think not more than a cord and a half. The cars, as then constructed, I think could not carry more than a cord and a half. The number of horses depended on the load. I used my own horses, and I think I usually used two horses; sometimes, perhaps, only one. I think never more than two.

7. To the seventh interrogatory. Only four attached to each car or load.

8. To the eighth interrogatory. I don't know that I know any thing of advantage to either party. I do not think there were any cars that had more than four wheels, in use on the Baltimore and Ohio Railroad, for some time after the winter of 1830–31. I know there were none with more than four wheels during that winter. The string-pieces on which wood was hauled were not more than from ten to fifteen feet in length. I speak of the burthen-cars more especially. I have very little recollection about the passenger-cars; they, I think, had but four wheels; but I have no recollection of their particular construction.

[Adjourned until the 12th February, 1854.]

And on the twelfth day of February, in the year eighteen hundred and fifty-four, the said John Bennett again appeared before me; and, being examined on the cross-interrogatories annexed to the Commission, further deposed, answered, and said:—

X 1. To the first cross-interrogatory. There were from ten to fifteen persons employed in cutting the wood, hauling it to the railroad, and loading the cars, &c. I do not recollect the name of any but Abel Cadwallader. Oliver Kinsey was concerned with me in the purchase, cutting, and sale of the wood. He lives, I believe, at present, in Richmond, Indiana. Abel Cadwallader was one of the persons who assisted in fetching the wood in on the cars. He lives either in Anne Arundel County, or Howard County, about a mile and a half below Elk Ridge Landing, on the Patapsco River. I cannot recollect the names of any of the others. It has been so long ago that I have forgotten the names of the other persons employed.

X 2. To the second cross-interrogatory. I suppose from fifty to a hundred cords of wood were sent to Baltimore, during the winter of 1830–31, by Kinsey and myself, on the railroad. I don't think there was any wood sent down the said railroad during that winter, by any other persons. I have no recollection of wood being transported over said road, during said winter, by any other persons, although a small quantity may have been sent by persons whom I do not now recollect.

X 3. To the third cross-interrogatory. I cannot swear positively that I saw every car used on said road for hauling wood, during that time, nor could any other man. I might have been away at times; but I know positively that there were none but four-wheel cars on said road, at that time. It was a considerable time after I had quit hauling wood on the road, before I ever saw a car on it with more than four wheels. I can't state how many cars I saw.

X 4. To the fourth cross-interrogatory. I think I could. I can positively swear that I never saw a car having eight wheels before July, 1831; I know I never did. I don't think there was one on the road before July, 1831; but I am positive there was no car with more than four wheels on the road, up to the spring of 1831.

X 5. To the fifth cross-interrogatory. I can't say.

X 6. To the sixth cross-interrogatory. I can't remember any thing about that. I had little to do with the railroad after the spring of 1831.

X 7. To the seventh cross-interrogatory. I never had any conversation with Ross Winans at all on this subject; nor have I done more than merely speak to him for five or six years past. I have had, I think, two conversations with Mr. Gould on this subject; they took place last summer or fall, when he asked me what I knew about the cars of which I have above spoken, and I told him. Two days ago he called to tell me to come and give my testimony before the Commissioner; but he said nothing to me about what testimony I was to give.

X 8. To the eighth cross-interrogatory. I knew nothing about them until they were propounded to me by the Commissioner, in their order. Mr. Gould told me to appear before Mr. Gale, who was the Commissioner; but did not state either the interrogatories that were to be put to me, or any thing about them.

X 9. To the ninth cross-interrogatory. I know nothing, except about the wood-cars; and I have already stated all that I know on that subject. I have no interest either way, and don't know what will be of advantage to either side.

JOHN BENNETT.

Subscribed before

LEVIN GALE, *Commissioner*.

[Adjourned until the 13th February, 1854.]

And on the thirteenth day of February, eighteen hundred and fifty-four, appeared before me ABEL CADWALLADER. And having been by me first carefully examined, and cautioned, and duly sworn to testify the whole truth, and being examined on the interrogatories and cross-interrogatories annexed to the Commission, deposed, answered, and said:—

(*For Interrogatories, see p. 376.*)

1. To the first interrogatory. My name is Abel Cadwallader. I am in the fifty-third year of my age. I have been engaged ever since the Baltimore and Ohio Railroad was first commenced, in excavating and digging on railroads, streets, cellars, &c. At present, I reside near Elk Ridge Landing, in Anne Arundel County. For the greater part of the last twenty-five years, I have resided in the city of Baltimore.

2. To the second interrogatory. I kept teams, and was engaged in hauling wood, stone, &c., in Baltimore and in the neighborhood.

3. To the third interrogatory. I was employed by John Bennett and by Oliver Kinsey, to haul wood on the Baltimore and Ohio Railroad, from the deep-cut to the city of Baltimore. I had nothing to do with preparing the wood. It was hauled by persons employed by Bennett and by Kinsey to the railroad. I suppose it was hauled about a mile to the railroad. I furnished the horses to draw the cars, and superintended the hauling to the city. It was hauled from two miles and a half to three miles on the railroad.

4. To the fourth interrogatory. All of the wood which was delivered by Bennett and by Kinsey, at the deep-cut, was transported to the city of Baltimore, on the Baltimore and Ohio Railroad. I can't recollect how much wood was so transported. I transported it over said road because I was employed to do so by Bennett and by Kinsey. I believe the wood transported to the city for Bennett and Kinsey, under my superintendence, was the first cord-wood ever transported over said railroad.

5. To the fifth interrogatory. Each of the cars used to transport such wood had four wheels. The cars had two string-pieces, one on each side, and a standard on each corner; that is, four standards. The distance between the standards was from twelve to fifteen feet.

6. To the sixth interrogatory. From a cord and a half to two cords was the load we hauled on said cars. One horse was attached to each loaded car, to draw it.

7. To the seventh interrogatory. I can't tell.

8. To the eighth interrogatory. I don't know any thing more. I recollect there were no brakes on the cars at that time; and we used to get a stick, and poke it over the wheel, and bear down on it.

(*For Cross-interrogatories, see p. 377.*)

X 1. To the first cross-interrogatory. John Bennett and Oliver Kinsey owned the wood. Bennett lives in the city of Baltimore, on South Paca-street, at the present time. Oliver Kinsey, I believe, is dead. I have not seen him for ten years, and I heard that he has been dead five or six years. He was a very intimate acquaintance of mine at that time. I think Solomon H. Phillips was concerned in cutting the wood, and hauling it to the city in wagons. I think, how-

ever, this was in the following year; however, I don't think he was concerned in hauling it in on the railroad. He lives in Sharp-street, in Baltimore, and carries on a brick-yard. Edward Gill, at that time, was employed by me to help to load and unload the cars; he is now employed by me, and boards with me. I don't recollect the names of any other persons. Upon reflection, I do recollect that George Snyder helped to load and unload the cars. I do not know what has become of him. I have not seen or heard of him for fifteen years, or perhaps more.

X 2. To the second cross-interrogatory. I can't tell how many cords I hauled; it has been too long ago, and I have forgotten. There was no other wood sent down that winter, except what was sent by Bennett and Kinsey, to the best of my recollection. I did not haul all the wood they sent by the railroad to the city that winter; but I do not think any other persons than Bennett and Kinsey, and those they employed, transported any cord-wood over said road during that winter.

X 3. To the third cross-interrogatory. I think I did see every car that was used for carrying cord-wood during that time; there was nothing to prevent me from seeing them all that was used during the fall of 1831 and winter of 1830-31. I don't know any thing about what cars were used during the summer of 1830. I can't tell how many wood-cars I saw; but I believe I saw all the cars that were used at that time. There were no car-houses built at that time, and there was nothing to prevent me from seeing them all. I don't think there were any car-houses built at that time; but I won't be positive about that.

X 4. To the fourth cross-interrogatory. No, I can't.

X 5. To the fifth cross-interrogatory. I can't say. In the winter of 1830-31, I was employed in hauling wood on the railroad, as above stated, and lived in the neighborhood; but, in the spring of 1831, I left Baltimore, and went to work on the Susquehanna Railroad, and had no connection with, or knowledge of, the Baltimore and Ohio Railroad, for a number of years afterwards.

X 6. To the sixth cross-interrogatory. I can't recollect how long ago it was; but I don't think I ever saw an eight-wheel car until 1835 or 1836, for I was on the other road, and had no business on the Baltimore and Ohio Railroad, or in the neighborhood. I don't recollect of any circumstances connected with my first seeing an eight-wheel car, or how many I then saw.

X 7. To the seventh cross-interrogatory. I never conversed with Ross Winans in my lifetime. I don't know Charles D. Gould at all. I saw a gentleman last fall, I suppose must have been Mr. Gould. He asked me what I knew about the wood-cars. I told him what I knew. I have not seen him since.

X 8. To the eighth cross-interrogatory. I never knew any thing about them at all.

X 9. To the ninth cross-interrogatory. I don't know of any. I can state, if of use to any one, that I don't know who made any of the

cars; and that I don't know Ross Winans' cars or engines from any others, unless I see his name on them as maker.

ABEL CADWALLADER.

Subscribed before

LEVIN GALE, *Commissioner*.

And I, Levin Gale, the Commissioner named in the annexed Commission, do further certify that the said John Bennett and Abel Cadwallader were by me first carefully examined, and cautioned, and duly sworn, according to law, to testify the whole truth; that their respective foregoing depositions were by me reduced to writing, and thereafter subscribed by them respectively, in my presence; that said witnesses were by me examined in a place separate and apart from each other, and from all other persons; and that the interrogatories and cross-interrogatories, annexed to the Commission, were propounded to them respectively, in their order, and their respective answers taken in the same order. And I do further certify, that I am not of counsel or attorney for either of the parties to the said cause, and that I am not interested in the event of the said cause.

Given under my hand and seal, this thirteenth day of February, in the year eighteen hundred and fifty-four.

LEVIN GALE. [SEAL.]

UNITED STATES OF AMERICA, }
DISTRICT OF MARYLAND, TO WIT. }

I, JOHN HANAN, a Commissioner appointed by the Circuit Court of the United States for the Fourth Circuit, in and for the Maryland District, pursuant to the Act of Congress, entitled "An Act for the more convenient taking of affidavits and bail in civil causes depending in the Courts of the United States," do hereby certify, that on the thirteenth day of March, in the year of our Lord one thousand eight hundred and fifty-four, at my office in the city of Baltimore, within the district of Maryland, personally appeared before me, Joshua J. Atkinson, a witness for the Plaintiff, in a certain civil cause depending in the Circuit Court of the United States for the district of Massachusetts, wherein Ross Winans is Plaintiff in equity against the Eastern Railroad Company. And the said witness, being by me first carefully examined, and cautioned, and duly sworn, according to law, to testify the whole truth, and being examined on behalf of the Plaintiff, makes oath, deposeth, and saith, as follows, to wit: —

My name is Joshua J. Atkinson; I reside in the city of Baltimore; I am connected with the Baltimore and Ohio Railroad Company; I am the Secretary and Treasurer of said company; I attend to all the financial matters; and I have charge of nearly all the vouchers belonging to said company.

Until within the last year, I have had all the books and papers of said company in my possession. They are still under my control, and I hereto annex the following papers, now belonging to said company, to wit: "Voucher No. 48, Abstract 'B,' a receipt for \$583;" "A Letter from Philip E. Thomas to Ross Winans, dated 11th February, 1834;" "Another Letter from Ross Winans to the company, dated 4th of July, 1831;" "A Copy of a Resolution from the Minutes of the Board, dated July 6, 1831;" and "A Copy of a Contract between Ross Winans and the Baltimore and Ohio Railroad Company, dated 11th February, 1834."

CROSS-EXAMINATION.

Deponent does not know if the annexed papers are those retained by Ross Winans under his receipt, but believes them to be, with the exception of the letter [C.] from "Ross Winans to the company, dated 4th of July, 1831." Deponent does not know any thing of the facts contained in those papers of his own knowledge; he was not in the service of the company at that time. Deponent thinks the chief engineer did write the letter [F.] to Ross Winans, which he has now in his hands, and which he now files and annexes to his deposition. And the signature thereto he believes is in Jonathan Knight's handwriting.

J. J. ATKINSON.

[A.]

BALTIMORE, MARCH 14th, 1831.

THE BALTIMORE AND OHIO RAILROAD COMPANY,

To ROSS WINANS, *Dr.*

1830. For my services as Assistant of Machinery from 1st of June to 31st of December, 1830, inclusive, 7 months, at \$1000 per annum, \$583

Approved by the Board, 4th April, 1831.

Baltimore, March 14th, 1831. Received of George Brown, Treasurer, the amount of the above account.

R. WINANS.

[B.]

OFFICE OF THE BALTIMORE AND OHIO RAILROAD COMPANY,
11th February, 1834.

Respected Friend,—In reply to thy letter on the subject of thy claim as the inventor of the "outside bearings" of railroad-carriages, I am instructed to say to thee that the Board of Directors of this company are willing to pay to thee the sum of five thousand dollars (\$5000), and to agree to retain thee in their service, at the salary now paid to thee of fifteen hundred dollars per annum, and with thy existing privileges (amongst which is that of rendering services to other companies as at present), so long as the improvement and perfection of machinery, or other objects similar to those to which thy employment at this time relates, may require attention in their business, and

so long as these duties may be faithfully discharged by thee; provided, that thee assigns to them thy individual right to use all inventions now made or patented by thee, or hereafter to be made or patented by thee, while retained in their employment, upon any railroad constructed by them, or upon any cars owned by them.

I am, respectfully, thy friend,

P. E. THOMAS,
President of the B. and O. R. Co.

To ROSS WINANS, Baltimore.

[C.]

BALTIMORE, JULY 4, 1831.

To the President and Directors of the Baltimore and Ohio Railroad Company:— My first engagement in the service of the company having expired the first of January last, since which time I have continued in the company's employ, and have, at request, given my attention to various things connected with the machinery of the road; superintending the construction of carriages, and improving the various parts thereof; assisting to plan and arrange the tunnels and sidings in the depots, and drawing plans thereof; making working-drawings for patterns and machinery generally on the road, and superintending the construction of patterns, and procuring castings; preparing for and making various experiments (ordered to be made); and some time and thought have been devoted to the improvement of the York engine, and making the working-drawings for it; and recently Mr. Knight, chief engineer, has expressed to me his desire that I should assist in the arrangement and superintendence of the construction of the steam-engine and machinery to be erected on the inclined planes at Parr Spring Ridge.

The rate of allowance heretofore received from the company has not been sufficient to defray my current expenses; and it will be out of my power to continue in the service of the company without receiving a sum per annum equal to my family-expenses. And as I have served the company for the last six months without receiving any thing, and without any express understanding, other than that it was probable that an addition would be made to my pay; it is respectfully submitted whether (for that time, and for what further time I may be employed in the service of the company) a sum of fifteen hundred dollars per annum would be more than a reasonable compensation.

Respectfully, &c.,

ROSS WINANS.

[D.]

Extract from the Minutes of the Board of Directors of the Baltimore and Ohio Railroad Company, 6th July, 1831.

“Resolved, That the chief engineer be authorized to appoint Ross Winans his assistant, at a salary of \$1500 per annum, to take effect from the 1st January, 1831.”

I certify the foregoing to be a true copy from the minutes.

J. J. ATKINSON, *Secretary.*

[E.]

THIS INSTRUMENT of writing, made this eleventh day of February, in the year of our Lord one thousand eight hundred and thirty-four, between Ross Winans, of the city of Baltimore, in the State of Maryland, of the first part, and the Baltimore and Ohio Railroad Company, of the second part.

WHEREAS the said Ross Winans has heretofore made many inventions in railways and railway carriages, and the machinery connected therewith, and amongst the rest in the diminution of friction by Winans' friction-wheel, secured to the said Winans by Letters Patent of the United States, dated October the eleventh, in the year eighteen hundred and twenty-eight; and by the use of diminished outside steel-journals for the axles of the wheels of railway carriages, for which Letters Patent of the United States were obtained by said Winans, dated July twentieth, in the year eighteen hundred and thirty-one; also an improvement in the mode of constructing the wheels of railway carriages by combining wood therewith, also secured by Letters Patent of the United States to the said Winans.

And whereas the said Winans has also made other inventions and improvements in railways and railway carriages, and the machinery connected therewith, for which it is likewise his purpose and intention to obtain Letters Patent; and whereas the said Ross Winans has agreed with the said Baltimore and Ohio Railroad Company to grant and sell to them the right and privilege to make, or cause to be made, and use, the said diminished outside steel-journal, the wheel of combined wood and iron, and, as far as the right of the same Winans exists therein, the said friction-wheel, and all other his said inventions, now made and patentable, and all such inventions and improvements in railways and railway carriages, and the machinery connected therewith, as said Winans may hereafter make or patent while he remains in the service of the said company, as hereinafter mentioned, for and during the same terms or periods for which the said Winans might be entitled to enjoy the same under any Letters Patent that he has obtained, or may obtain therefor, upon any railroad constructed by the said company, or upon any cars owned by them. In consideration whereof, the said company have agreed to pay the said Winans the sum of five thousand dollars (\$5000), and to retain the said Winans in the service of the said company; to be engaged in the perfection and improvement of machinery, and other objects similar to those to which the employment of the said Winans, before the date of these presents, related, and at a salary of fifteen hundred dollars per annum, with the privilege to the said Winans of rendering to other companies, as he has done before the date of these presents, similar services, so long as the improvement and perfection of such machinery or other objects, as aforesaid, may require attention in the business of the said company, and so long as he shall discharge his duty in these respects faithfully.

Now, therefore, this instrument of writing witnesseth, that for and in consideration of the sum of five thousand dollars to the said Ross

Winans, in hand, paid by the said company, at and before the sealing and delivery of these presents, the receipt whereof is hereby acknowledged, and for and in consideration of the other matters and things in the said hereinbefore recited agreement set forth, the said Ross Winans hath granted, assigned, and set over, and by these presents doth grant, assign, and set over, to the said Baltimore and Ohio Railroad Company, the right and privilege to make, or cause to be made, and use the said diminished outside steel-journals, the combined wheel of wood and iron aforesaid, and, so far as the right of the said Winans exists therein, the said friction-wheel, and all his the said Winans' other inventions, now made and patentable, and all such inventions and improvements as he, the said Winans, may make or patent while he remains in the service of the said company, as hereinbefore mentioned, in railways and railway carriages, and the machinery connected therewith, for and during the same terms or periods for which the said Winans might be entitled to enjoy the same under any Letters Patent that he has obtained or may obtain therefor, upon any railroad constructed by the said company, or upon any cars owned by them. And the said Winans doth hereby further relinquish and release to the said company all claim which he, the said Winans, might or could have against the said company for the use heretofore by them of any of his inventions and improvements in railways and railway carriages, and the machinery connected therewith.

In witness whereof, the said Ross Winans hath hereto set his hand and seal on the day and year first above written.

ROSS WINANS. [SEAL.]

I certify the above to be a true copy, taken from the records of the Baltimore and Ohio Railroad Company.

In testimony whereof, I hereunto subscribe my name, and affix the corporate seal of the company, on this twenty-fifth day of June, in the year eighteen hundred and forty-nine.

[L. S.]

J. J. ATKINSON, *Secretary*.

[F.]

ENGINEER'S OFFICE, BALTIMORE AND OHIO RAILROAD,
Baltimore, July 7, 1831.

To Ross Winans, Civil Engineer:—The Board of President and Directors of the Baltimore and Ohio Railroad Company, at their meeting of yesterday, having authorized me to appoint thee to the office of assistant engineer to the chief engineer in the service of the said company, I hereby inform thee of thy appointment accordingly.

Thy duties will especially extend to the planning, drawing, procuring, arranging, and setting up, of the machinery, fixtures, and engines to be placed upon, or connected with, and attached to, the inclined planes, and the working of the same, across Parr's Ridge, as the same shall be adopted or approved by the chief engineer; together with such other duties as shall from time to time be required of thee.

Thy compensation will be a salary at the rate of fifteen hundred

dollars per annum, payable quarterly. And I am further authorized to say, that, in consequence of services already rendered, but not compensated, thy said salary will be made to commence on the first day of January last (1831).

Thee will, therefore, enter upon the duties first above mentioned, as soon as shall be convenient.

Very respectfully,

J. KNIGHT, *Chief Engineer.*

And I, JOHN HANAN, a Commissioner, as aforesaid, do also certify that the reason for taking the foregoing deposition of said Joshua J. Atkinson, is, that the said witness lives in the city of Baltimore, in the State of Maryland, and at a greater distance than one hundred miles from the place of trial of the aforesaid cause of Ross Winans against the Eastern Railroad Company, depending, as aforesaid, in the Circuit Court of the United States for the Massachusetts District.

And I do also certify, that notice was given to the Counsel for the Defendants to be present at the taking of said deposition, and to put interrogatories if they might think fit; and that William W. Hubbel, Esq., the Counsel for the Defendants, was present at the taking of the same.

And I do also certify, that the Deponent was by me first carefully examined, and cautioned, and duly sworn according to law, to testify the whole truth; and that the foregoing deposition was then reduced to writing by me, and thereafter subscribed by the said Deponent in my presence. And I do further certify, that I am not of counsel or attorney for either of the parties in the said cause, and that I am not interested in the event of the said cause.

Given under my hand and seal, at the city of Baltimore, within the district of Maryland, this 13th day of March, in the year of our Lord one thousand eight hundred and fifty-four.

JOHN HANAN,
Commissioner for Maryland. [SEAL.]

UNITED STATES OF AMERICA.

THE CIRCUIT COURT OF THE UNITED STATES FOR THE FIRST CIRCUIT AND DISTRICT OF MASSACHUSETTS.

ROSS WINANS *vs.* EASTERN RAILROAD COMPANY,

IN EQUITY.

DISTRICT OF MASSACHUSETTS.

BE it remembered, that, on the third day of November, in the year of our Lord eighteen hundred and fifty-three, at Boston, in said district of Massachusetts, before me, Edw. G. Loring, a Commissioner in and for the district of Massachusetts, to take affidavits and bail in civil causes depending in the Courts of the United States, appointed by the Circuit Court of the United States for the First

Circuit, under the Acts of Congress in such case made and provided, personally appeared Nathan Hale, Esquire, of Boston, in said district, a witness of sound mind and lawful age, a witness for the Plaintiff in a certain civil suit depending in the Circuit Court of the United States in and for the First Circuit and District of Massachusetts, wherein Ross Winans is Plaintiff, and the Eastern Railroad Company is Defendant. And the said Nathan Hale, being by me first carefully examined, and cautioned, and sworn to testify the whole truth, did depose and say as follows, viz:—

I, NATHAN HALE, of the city of Boston, in the District of Massachusetts, Esquire, of lawful age to testify on oath, depose and say in answer to interrogatories by Charles P. Curtis, Jr., Esq., Counsel for Ross Winans,—

1. Whether or not were you at any period of time connected with the Boston and Worcester Railroad Company? If yea, in what capacity, and for what period of time?

Ans. I was president of the company from its establishment in 1831 or 1832 to 1849.

2. Whether or not was Mr. James F. Curtis connected with the said road? If yea, in what capacity, and during what period of time?

Ans. Mr. Curtis was superintendent of the company from about the year 1835 to 1839, I think.

3. Please look at the paper-writing shown you, marked A. E. G. L. (page 391), and state in whose handwriting it is, and please annex a copy thereof to your deposition.

[Mr. Whiting, for the Respondent, objected to the putting of this question after the answer was given, and Mr. Curtis required it to be stated that the objection was after the answer. Mr. Whiting stated he was not aware the question had been answered, when he made the objection. He objects to the question as irrelevant and inadmissible.]

Ans. The paper, I think, is in the handwriting of Mr. J. F. Curtis, except the memorandum on the back. I annex a copy without the memorandum.

[Mr. Whiting, after reading the paper exhibited, objected to the question further, as seeking to introduce in evidence a copy of a paper which the witness has and can annex to his deposition, and of seeking to introduce by a paper-writing evidence of a fact which should be proved by the person making the paper, or some one else.]

4. Please state whether or not the said paper belongs to you, and annex the original if you have it in your possession.

Ans. The paper does not belong to me, and I do not recollect having seen it till it was shown to me; the original is not in my possession.

5. Please state whether or not Mr. James T. Curtis is now living; and, if not, when did he de cease?

Ans. Mr. Curtis was killed on the Worcester road in the spring of 1839, I think.

6. Please look at the paper-writing marked B. E. G. L. (page 391), and state whose signatures are attached to it, and whether or not they were attached to it at or about the date thereof. If not, when?

Ans. The signatures are mine and Ross Winans'.

[Mr. Whiting objects to this question as irrelevant and inadmissible.]

I have no doubt it is Ross Winans' signature, for I recollect the transaction, and that he executed a paper of that general purport, and therefore I have no doubt it is his signature; it is in connection with mine. I was at the time President and Superintendent of the company. I can't say from recollection that the signatures were attached at the date of the transaction; it must have been near the time. I've no recollection of executing it at any other time.

7. Have you the original paper in your possession? And, if so, will you annex it?

Ans. It is not in my possession.

8. Have you any recollection of Mr. Winans being in the employ of the said railroad company? If yea, during what term, and in what capacity?

Ans. He was in the employ of the company in pursuance of that agreement, with an interval between the two six months; of how long I can't say. He may have been for a longer period, but I am not able to say.

[Mr. Whiting objects to this question here as irrelevant and inadmissible.]

9. Please look at the paper-writing shown you, marked C. E. G. L., and state in whose handwriting it is, and if any part is the handwriting of any other persons. Please state in whose handwriting it is.

Ans. It is all in my handwriting, except the label.

10. Please state if the said original paper is in your possession; and, if so, please annex it to your deposition; if not, please annex a copy.

[Mr. Whiting objects that the paper is in the possession of Plaintiff, and now produced to witness; and the copy thereof is inadmissible.]

Ans. The original is not in my possession, and I annex a copy, marked C. E. G. L.

Cross-interrogatories by Mr. Whiting, for Respondent.

X 1. Was there a dispute between the company and Winans in regard to his compensation? If so, state the nature of the difficulty between you.

Ans. It is not easy to state the nature of a controversy that lasted so long. Mr. Winans made a claim for services, and for the use of

outside bearings on car-wheels, for which he claimed a patent, which claim the company considered inadmissible. I attempted to adjust that claim with Mr. Winans; and the letter referred to in my former answer, and marked C. E. G. L., shows that a proposition made by Mr. Winans for a settlement was not accepted by the company. The ground taken by the company was, that the compensation agreed on for his services included the compensation for such machinery as he should recommend.

X 2. How long a time elapsed before a final settlement was made? who made it, and what is the evidence as to the settlement?

Ans. I've no recollection any settlement ever was made.

X 3. Have you stated all the demands and claims ever made upon your company by said Winans, as far as you know?

Ans. I've no recollection of any other.

NATHAN HALE.

[A. E. G. L.]

"Mr. Winans will be good enough to inform me whether he will permit me to build a car similar to the Baltimore and Washington eight-wheeled. I think he told me that he had patented the improvement, and, if the plan is adopted, on what conditions he will furnish the Corporation a right for the future, how much per car, and how much in full for any number.— Your obedient Servant,

"J. F. CURTIS, *Superintendent.*"

[B. E. G. L.]

MEMORANDUM OF AGREEMENT by and between Nathan Hale, Esq., Superintendent of the Boston and Worcester Railroad Corporation, and Ross Winans, of Baltimore, Maryland.

It is agreed by the parties that the said Winans is to render the following services to said corporation for the term of one year (or more, if the said corporation requires it), to wit:

Said Winans, under the advice and direction of the said superintendent, and of the engineer of said corporation, is to give such plans, drawings, instructions, and attendance to workmen and superintendents, who may be employed for the purpose, as will enable them to construct such patterns, wagons, carriages, turnouts, engines, tenders, machinery, &c., as may be required on said road, agreeably to the best of his ability, and to give such advice and suggestions, as he may be capable of doing, relative to all things connected with said road, to which his attention may be called.

It is understood by the parties, that the said Winans is rendering similar services to other companies, and that only so much of his personal attention is required as will enable him to accomplish the objects in view.

It is also understood that the said corporation has the privilege of dividing the time above mentioned into different periods, neither

of which to be of less duration than six months, and notice being given of the commencement and termination of each period.

The compensation to be received by the said Winans for the foregoing services is fifteen hundred dollars per annum; the first period commencing April 15, 1833, payable quarterly.

[Signed.]

NATHAN HALE, *Superintendent.*
ROSS WINANS.

BOSTON, APRIL 16, 1833.

[C. E. G. L.]

Mr. Ross Winans: Dear Sir,—I submitted to the directors of the Boston and Worcester Railroad Corporation this afternoon the proposition which you made me for compromising your claim against the corporation; and, after consideration, they voted not to accept it.

With a view, however, of endeavoring to effect a compromise on such terms as a majority of the Board are willing to agree to, and of avoiding all further controversy, I was instructed to offer to pay you the sum of \$2000, in full, for that claim, and all other claims which you may have for any other improvements in railroad machinery now made by you, and which may be used by this corporation, provided the Lowell and Providence Railroad Corporation agree to pay in like proportion, and that this proposition be acceded to within ten days. Respectfully your very obedient servant.

NATHAN HALE,

President Boston and Worcester Railroad Corporation.

BOSTON, JUNE 8, 1835.

UNITED STATES OF AMERICA, }
DISTRICT OF MASSACHUSETTS. }

I, EDWARD G. LORING, a Commissioner in and for the District of Massachusetts, to take affidavits and bail in civil causes depending in the Courts of the United States, appointed by the Circuit Court of the United States for the First Circuit, under the Acts of Congress in such case made and provided, do hereby certify that the reason for taking the foregoing deposition is the consent of parties.

I further certify that a notification signed by me, the Commissioner aforesaid, before whom the said deposition was taken, to the adverse party to be present at the taking of the same and to put interrogatories if he saw fit, was first made and served on William Whiting, Counsel and Attorney for said adverse party, being the nearest and within one hundred miles of the place of caption, allowing time for his attendance after being notified, not less than at the rate of one day, Sundays exclusive, for every twenty miles' travel; and said William Whiting, Esq., did attend.

I further certify that the said deposition was by me reduced to writing in the presence of the witness, and that he subscribed the same in my presence; and that I have retained it for the purpose

of forwarding it under my own hand to the Court for which it was taken, with this certificate of the reason of its being taken.

I further certify that I am not of counsel or attorney to either of the parties in the cause, in and for which the said deposition is taken, or interested in the event of said cause.

In testimony whereof, I have hereto set my hand and seal, this third day of November, in the year of our Lord eighteen hundred and fifty-three.

EDW. G. LORING,
*Commissioner to take Affidavits and Bail, of the
Circuit Court of U. S., Mass. District.*

UNITED STATES OF AMERICA.

[L. S.]

THE CIRCUIT COURT OF THE UNITED STATES, WITHIN AND FOR THE MASSACHUSETTS
DISTRICT.

MASSACHUSETTS DISTRICT, ss.

*To the Honorable Roger Baldwin, of New Haven, in the State of
Connecticut; or John P. Beach, Esquire, of said New Haven.*

KNOW YE, that, reposing confidence in your wisdom, prudence, and fidelity, we have appointed, and by these presents do authorize and empower, you to take the answers to the interrogatories hereunto annexed, of James Brewster, of New Haven, Connecticut, witness to be examined on behalf of the Complainant, and to be used in a certain cause now pending in said Court, wherein Ross Winans is Plaintiff, in equity, *vs.* The Eastern Railroad Company, Defendants.

And to this end, at certain days to be by you appointed for that purpose, to cause said witnesses, as aforesaid, to be brought before you; and each witness, while present before you, to examine carefully on oath touching the premises. And, when you shall have taken the examination as aforesaid, to reduce or cause the same to be reduced to writing, and to be subscribed by each of said witnesses in your presence; and the same, so taken and subscribed, to return, together with this Commission and your doings herein, enclosed, sealed, and directed to the Circuit Court aforesaid, holden at Boston, as soon as the same shall have been executed.

In testimony whereof, we have caused the seal of the said Circuit Court to be hereunto affixed.

Witness, the Honorable Roger B. Taney, at Boston, this twentieth day of June, in the year of our Lord one thousand eight hundred and fifty-three.

H. W. FULLER, *Clerk.*

N. B. — You shall not, except by consent of the parties in writing, permit either party to attend at the taking of the deposition, either himself, or by any attorney or agent, nor to communicate by inter-

rogatories or suggestions with the Deponent whilst giving his deposition in answer to the interrogatories annexed to this Commission. And you shall take such deposition in a place separate and apart from all other persons, and permit no person to be present during such examination, except the Deponent and yourself, and such disinterested person (if any) as you may think fit to appoint as a clerk, to assist you in reducing the deposition to writing. And you shall put the several interrogatories and cross-interrogatories to the Deponent, in their order, and take the answer of the Deponent to each, fully and clearly.

[N. B.—Depositions to be taken on paper of like size with this Commission.]

UNITED STATES CIRCUIT COURT, }
MASSACHUSETTS DISTRICT.—October Term, 1853. }

ROSS WINANS vs. THE EASTERN RAILROAD COMPANY,

IN EQUITY.

Interrogatories to James Brewster, of New Haven, Connecticut, on behalf of the Complainant.

(See page 395.)

1. What is your name, age, and place of residence?
2. If you were at any time, or now are, an officer of the Hartford and New Haven Railroad Company, please state what office you filled, and for what period of time. When did you commence?
3. Do you know the Complainant, Ross Winans? If yea, how long have you known him, and when and where did you become acquainted with him?
4. Are you acquainted with the construction and mode of operation of the eight-wheeled cars in general use on railroads in this country? If yea, whether or not such cars are used upon the railroad with which you are or were connected, and when did such use commence?
5. Whether or not you had, at any time, any negotiations on behalf of the said company with Ross Winans, the Complainant, in reference to the introduction of said eight-wheeled cars upon your said road, and in reference to a license from him to the said company, to use the same thereon? If yea, please to state what such negotiations were about, specifically, and what result they came to; also please state the year and month, as near as you can, when such negotiations commenced.

[Objected to, as irrelevant.]

6. Whether or not you had at any time, and when, any correspondence with the said Winans, in reference to the use of the said eight-wheeled cars on your said road? If yea, please state on whose behalf said correspondence was carried on by you; and please annex

to your deposition all of such correspondence; or, if you decline annexing the original letters, please annex true copies thereof.

[Objected to, as irrelevant.]

7. Whether or not the said company have received any license from the said Winans to use said eight-wheeled cars, or any other license from said Winans? and, if yea, please annex copies of any and all licenses from said Winans to the said company.

C. P. CURTIS, JR., *Complainant's Solicitor.*

Cross-interrogatories to be proposed to James Brewster.

X 1. If, in answer to the preceding interrogatories, you say that you have used on said railroad the eight-wheel railway car, will you describe the running-part particularly?

X 2. Was the frame of said trucks a rectangular rigid wooden frame, such as is now in general use? What was the diameter of the wheels? What was the distance from centre to centre of the axles? Had it any pedestals? Had it a transom-plate.

X 3. Were the axles of each truck connected together by a *spring* bolted upon the boxes in which the axle-journal ran? Were the wheels as close together as they could be without the flanches touching?

WM. WHITING, *Defendants' Solicitor.*

A true copy. Attest,

H. W. FULLER, *Clerk.*

To the Honorable Circuit Court of the United States, within and for the Massachusetts District.

On this 23d day of July, A. D. 1853, at the town of New Haven, in New Haven County, State of Connecticut, I, JOHN S. BEACH, Commissioner named in the foregoing Commission, by virtue and in pursuance thereof, caused James Brewster, of said New Haven, the witness named in said Commission, to come before me. And, he having been first duly sworn by me, I proceeded to put to him the several interrogatories and cross-interrogatories annexed to said Commission, in their order; no other person being present at or during said examination, but the said Deponent and myself. To which said interrogatories and cross-interrogatories, the said Deponent answers as follows, to wit:—

(See page 394.)

1. To the first interrogatory, he saith: That his name is James Brewster. That he is sixty-five years of age, and resides in the town of New Haven, County of New Haven, and State of Connecticut.

2. To the second interrogatory, he saith: I was the first President

of the New Haven and Hartford Railroad Company, which was incorporated in the year 1833. My impression is, that the company first organized in the year 1835.

3. To the third interrogatory, he saith: My acquaintance with Mr. Ross Winans is slight. In the year 1835, I think, Mr. Alexander C. Twining having been appointed engineer and superintendent of our road, he and myself were appointed a committee to travel and obtain information. We were directed to go to Baltimore, where had been constructed the first railroad made in this country, as we supposed. We went, and made the acquaintance of Mr. Winans, to whom we were recommended as being acquainted with the construction and management of railroad cars.

4. To the fourth interrogatory, he saith: I do not profess to have any practical knowledge upon the subject of eight-wheel or other railroad cars; that being the province of the engineer and superintendent. I acted merely as adviser. I have no knowledge of any passenger-cars ever having been in use upon the New Haven and Hartford Railroad, except eight-wheel cars, though there might have been. My impression is, that the running-part of one eight-wheel car was furnished us by Mr. Winans, in the year 1836. It was stowed away, the road not being ready for use; and so long a time has since transpired, I am not able to say when we first commenced running it on the road.

5. To the fifth interrogatory, he saith: All that occurs to me is, that early in the year 1836 we agreed with Mr. Winans to send us the running-part of one eight-wheel car. He sent it, with the bill, which the company paid; and there our intercourse ceased. I supposed that the bill for the car was in full for the privilege to use it. I have no recollection of any negotiations with Mr. Winans for a license to use eight-wheel cars on our road, though there might have been.

6. To the sixth interrogatory, he saith: I have no recollection of any correspondence of the kind inquired after, though there might have been. Probably, if there was any, it was on the part of Mr. Twining. It would have been his province to carry it on, not mine. If there was any such correspondence, it would be found among the records of the company, with which I have now no official connection, and have not had for many years.

7. To the seventh interrogatory, he saith: The said company have not, to my knowledge, ever received any license from the said Winans to use said eight-wheeled cars, other than that implied in sending a bill for the eight-wheeled car he made for them. Whether there was any distinct charge in the bill for the right to use, I do not recollect.

JAMES BREWSTER.

(See page 395.)

X 1. To the first cross-interrogatory, Deponent saith: I can't do it. I never gave sufficient attention to the subject, to enable me to describe the running-part of cars; and I have no practical acquaintance with the matter.

X 2. To the second cross-interrogatory, he saith: I cannot tell whether the frame of the truck was a rectangular rigid wooden frame or not; nor what was the diameter of the wheels; nor the distance from centre to centre of the axis; nor whether it had, or had not, any pedestals or transom-plate.

X 3. To the third cross-interrogatory, he saith: I am not able to say whether the axles of each truck were connected by a spring-bolster upon the boxes in which the axle-journals ran. My impression is, that the wheels were as close together as they could be without the flange touching.

And further Deponent saith not.

JAMES BREWSTER.

STATE OF CONNECTICUT, }
COUNTY OF NEW HAVEN, ss., NEW HAVEN. }

Personally appeared before me, this 23d day of July, A. D. 1853, James Brewster, of said town, signer of the foregoing deposition, and made solemn oath to the truth of the same, which was taken to be used in the case of *Ross Winans vs. The Eastern Railway Company*, now pending in the Circuit Court of the United States, within and for the Massachusetts District, by virtue and in pursuance of the foregoing Commission. And said deposition was reduced to writing by me, and subscribed and sworn to, by said Deponent, before me.

JOHN S. BEACH, *Commissioner*.

UNITED STATES OF AMERICA,

[L. S.]

THE CIRCUIT COURT OF THE UNITED STATES, WITHIN AND FOR THE MASSACHUSETTS
DISTRICT.

MASSACHUSETTS DISTRICT, ss.

To Henry Hubbard, Jr., of Charlestown, in the State of New Hampshire, Esquire.

KNOW YE, that, reposing confidence in your wisdom, prudence, and fidelity, we have appointed, and by these presents do authorize and empower, you to take the answers to the interrogatories hereunto annexed, of H. H. Sylvester, of Charlestown, N. H., witness to be examined on behalf of the Complainant, and to be used in a certain cause now pending in said Court, wherein *Ross Winans* is Plaintiff, *vs. the Eastern Railroad Company*, Defendant, in equity. And, to this end, at certain days to be by you appointed for that purpose, to cause said witnesses, as aforesaid, to be brought before you, and each witness, while present before you, to examine carefully, on oath, touching the premises. And, when you shall have taken the exami-

nation as aforesaid, to reduce or cause the same to be reduced to writing, and to be subscribed by each of said witnesses in your presence. And the same, so taken and subscribed, to return, together with this Commission and your doings herein, enclosed, sealed, and directed to the Circuit Court aforesaid, holden at Boston, as soon as the same shall have been executed.

In testimony whereof, we have caused the seal of the said Circuit Court to be hereunto affixed.

Witness, the Honorable Roger B. Taney, at Boston, this twentieth day of June, in the year of our Lord one thousand eight hundred and fifty-three.

H. W. FULLER, *Clerk.*

N. B. — You shall not, except by consent of the parties in writing, permit either party to attend at the taking of the deposition, either himself, or by any attorney or agent, nor to communicate by interrogatories or suggestions with the Deponent whilst giving his deposition, in answer to the interrogatories annexed to this Commission. And you shall take such deposition in a place separate and apart from all other persons, and permit no person to be present during such examination, except the Deponent and yourself, and such disinterested person (if any) as you may think fit to appoint as a clerk, to assist you in reducing the deposition to writing. And you shall put the several interrogatories and cross-interrogatories to the Deponent, in their order, and take the answer of the Deponent to each, fully and clearly.

UNITED STATES CIRCUIT COURT, }
MASSACHUSETTS DISTRICT. — October Term, 1852. }

ROSS WINANS *vs.* THE EASTERN RAILROAD COMPANY,

IN EQUITY.

Interrogatories to be proposed to H. H. Sylvester, of Charlestown, New Hampshire, on behalf of the Complainant.

1. What is your name, age, and residence?
2. Whether or not you are or have been connected with the United States Patent Office, at Washington; and, if yea, when, in what capacity, and for what period, have you been so connected; and who was the Commissioner of Patents during the time?
3. Please state whether or not, while you have been in the Patent Office, the Commissioner of Patents has been occasionally and temporarily absent from Washington; and, if yea, what has been the practice in the Patent Office in regard to the performance of his duties during such temporary absences? Who acted as Commissioner; and what acts has it been, or is it, customary for the acting Commissioner to perform during such temporary absences?

4. If you have said that it has been or is customary for the acting Commissioner to issue or extend Letters Patent during the temporary absence of the Commissioner of Patents, please state, if you can, what proportion of patents have been or are issued or extended in this manner; and, if you cannot state precisely, do so as nearly as you can.

C. P. CURTIS, JR., *Solicitor for Complainant.*

A true copy. Attest,

H. W. FULLER, *Clerk.*

Answers of Henry H. Sylvester, of Charlestown, New Hampshire, to the Interrogatories hereunto annexed, proposed to him on behalf of the Complainant, in a certain cause, Ross Winans vs. the Eastern Railroad Company, in equity, now pending in the Circuit Court of the United States, Massachusetts District.

1. Answer to first interrogatory. Henry H. Sylvester; about sixty years; Charlestown, Sullivan County, New Hampshire.

2. Answer to second interrogatory. I have been; from the spring of 1845 to the summer of 1849; in the capacity of chief clerk; for a period of about four years. Edmund Burke, of Newport, New Hampshire, was Commissioner of Patents during that period.

3. Answer to third interrogatory. The Commissioner was temporarily absent several times while I was chief clerk in the Patent Office. It was the uniform practice, during such temporary absences, for the chief clerk to perform all the duties of the Commissioner. I always acted as Commissioner during the temporary absences of Mr. Commissioner Burke; and it was customary for the acting Commissioner, during such temporary absences, to perform any and all the acts that the Commissioner was accustomed to perform when present in the discharge of the duties of his office; amongst which were the ordering the issues and the re-issues of Letters Patent, the rejecting or allowing applications for extensions of Letters Patent, and countersigning the same as "Acting Commissioner."

4. Answer to the fourth interrogatory. I cannot state the exact proportion of Letters Patent issued or extended as above stated, by the acting Commissioner; but, during the four years I was in the Patent Office, some thirty or forty Letters Patent were issued and re-issued monthly, with only a very few extensions yearly. Mr. Commissioner Burke was temporarily absent from the Patent Office during the same four years, from four to six weeks in each year; and I, being chief clerk, ordered to be issued, re-issued, and extended, all the Letters Patent as acting Commissioner during such temporary absences, as were acted upon and allowed in the office. But, by a recurrence to the annual reports of the Commissioner to Congress, I find that there were issued over twenty-three hundred Letters Patent, during the four years above named; and that there were

thirty-nine applications for extensions, nine only of which were granted. Of the Letters Patent issued in that period, probably three hundred were ordered to be issued and countersigned by me, as acting Commissioner. I do not remember of granting, as acting Commissioner, more than three or four of the extensions.

HENRY H. SYLVESTER.

STATE OF NEW HAMPSHIRE, }
SULLIVAN, ss. }

TO THE CIRCUIT COURT OF THE UNITED STATES, WITHIN AND FOR THE MASSACHUSETTS DISTRICT.

I, HENRY HUBBARD, JR., authorized and empowered by said Court to take the answers to the interrogatories hereunto annexed, proposed to Henry H. Sylvester, on behalf of the Complainant, and to be used in a certain cause now pending in said Court, wherein Ross Winans is Plaintiff, and the Eastern Railroad Company are Defendants, in equity, do respectfully report to the Circuit Court aforesaid, that I caused said Sylvester to come before me, on the eleventh day of July, instant; and, while present before me, the said Sylvester having first made solemn oath that he would true answers make to the interrogatories that should be put to him touching the premises, I did examine him carefully on oath, and put to him all the aforesaid interrogatories, in their order, and did take his answer to each fully in writing; which answers are hereunto annexed, and were subscribed by him on said eleventh day of July, in my presence.

And I do further report, that the deposition was taken in a place separate and apart from all other persons, no one being present except the Deponent and myself; and no one, to my knowledge, had any communication whatsoever with him touching the premises. And in all other respects I obeyed the instructions of the Court, set forth in the annexed Commission.

Witness my hand, this twelfth day of July, A. D. eighteen hundred and fifty-three.

HENRY HUBBARD, JR.,

Justice of the Peace and Commissioner.

NASHUA AND LOWELL RAILROAD OFFICE.

"At a meeting of the Directors of the Nashua and Lowell Railroad Company, on the 28th of May, 1838, a committee before appointed to examine as to the most suitable kind of engines, cars, &c.," reported in favor of the "eight-wheel cars." Also, "voted, that Messrs. Holbrook and Clark be a committee to procure a suitable number of eight-wheeled cars for the use of our road."

UNITED STATES OF AMERICA.

[L. S.]

THE CIRCUIT COURT OF THE UNITED STATES, WITHIN AND FOR THE MASSACHUSETTS
DISTRICT.

MASSACHUSETTS DISTRICT, ss.

*To David A. Hall, Esq., of Washington, in the District of Columbia,
Esquire.*

KNOW YE, that, reposing confidence in your wisdom, prudence, and fidelity, we have appointed, and by these presents do authorize and empower, you to take the answers to the interrogatories hereunto annexed of Roger C. Weightman and — Little, clerks in the Patent Office, in Washington, D. C., witnesses to be examined on behalf of the Complainant, and to be used in a certain cause now pending in said Court, wherein Ross Winans is Plaintiff, in equity, *vs.* the Eastern Railroad Company, Defendants. And to this end, at certain days to be by you appointed for that purpose, to cause said witnesses, as aforesaid, to be brought before you; and each witness, while present before you, to examine carefully on oath touching the premises. And, when you shall have taken the examination as aforesaid, to reduce or cause the same to be reduced to writing, and to be subscribed by each of said witnesses, in your presence. And the same, so taken and subscribed, to return, together with this Commission and your doings herein, enclosed, sealed, and directed to the Court aforesaid, holden at Boston.

In testimony whereof, we have caused the seal of the said Circuit Court to be hereunto affixed.

Witness, the Honorable Roger B. Taney, at Boston, this twentieth day of June, in the year of our Lord one thousand eight hundred and fifty-three.

H. W. FULLER, *Clerk.*

N. B. — You shall not, except by consent of the parties in writing, permit either party to attend at the taking of the deposition, either himself, or by any attorney or agent, nor to communicate by interrogatories or suggestions with the Deponents, whilst giving their deposition in answer to the interrogatories annexed to this Commission. And you shall take such deposition in a place separate and apart from all other persons, and permit no person to be present during such examination, except the Deponent and yourself, and such disinterested person (if any) as you may think fit to appoint as a clerk, to assist you in reducing the deposition to writing. And you shall put the several interrogatories and cross-interrogatories to the Deponent, in their order, and take the answer of the Deponent to each, fully and clearly.

[N. B. — Depositions to be taken on paper of like size with this Commission.]

UNITED STATES CIRCUIT COURT, }
MASSACHUSETTS DISTRICT. — October Term, 1852. }

ROSS WINANS vs. THE EASTERN RAILROAD COMPANY,

IN EQUITY.

Interrogatories to be proposed to Roger C. Weightman and A. B. Little, clerks of the Patent Office, in Washington, D.C., on behalf of the Complainant.

1. What is your name, age, and residence?
2. Whether or not you are or have been connected with the United States Patent Office, at Washington; and, if yea, when and in what capacity, and for what period, have you been so connected; and who was the Commissioner of Patents during the time?
3. Please state whether or not, while you have been in the Patent Office, the Commissioner of Patents has been occasionally and temporarily absent from Washington; and, if yea, what has been the practice in the Patent Office, in regard to the performance of his duties during such temporary absences? Who acted as Commissioner; and what acts has it been or is it customary for the acting Commissioner to perform during such temporary absences?
4. If you have said that it has been or is customary for the acting Commissioner to issue or extend Letters Patent during the temporary absence of the Commissioner of Patents, please state, if you can, what proportion of patents have been or are issued or extended in this manner; and, if you cannot state precisely, do so as nearly as you can.

C. P. CURTIS, JR., *Complainant's Solicitor.*

[The Defendant objects to all the preceding interrogatories as irrelevant and immaterial, and as attempting to prove orally that which can be proved only by records. And he further objects to them as inadmissible and incompetent testimony; also because the entire name of Mr. Little is not stated.]

WILLIAM WHITING, *Counsel for Respondents.*

The depositions of witnesses, taken in virtue of the Commission hereto annexed, to be used in a certain cause depending in the Circuit Court of the United States, within and for the District of Massachusetts, wherein Ross Winans is Plaintiff, and the Eastern Railroad Company are Defendants, as follows, viz.:—

ROGER C. WEIGHTMAN, being duly sworn, deposed and saith as follows, viz.:—

1. To the first interrogatory, annexed to the said Commission, he

saith: I am sixty-six years of age, and reside in the city of Washington.

2. To the second interrogatory, he saith: I was clerk in the Patent Office two years, ending the first of June of the present year. During that period, there have been three different Commissioners of Patents, viz.: Thomas Ewbank, Silas H. Hodges, and Charles Mason.

3. To the third interrogatory, he saith: At various times while I was chief clerk, the Commissioner of Patents has been absent from the office. On such occasions, it has been the uniform practice for the chief clerk to perform all the duties of the Commissioner during such absence; and it has been understood in the office that this practice was sanctioned by the second section of the act of the 4th of July, 1836, entitled "An Act to promote the progress of the useful arts," &c.

4. To the fourth interrogatory, Deponent saith: I believe that the proportion of Patents signed by the chief clerk as acting Commissioner has been estimated at about one sixth part of the whole number; and I consider that a fair estimate.

The proportion of extensions under the chief clerk has been probably somewhat less.

R. C. WEIGHTMAN.

Subscribed and sworn to before me, this 2d July, 1853.

D. A. HALL, *Commissioner*.

AMOS B. LITTLE, being duly sworn, doth depose and say as follows, viz.:—

(See page 402*.)

1. To the first interrogatory, he saith: My name is Amos B. Little. I am thirty-one years of age, and a resident of the city of Washington.

2. To the second interrogatory, he saith: I am connected with the Patent Office, and have been since 1845. My position is that of a clerk in the said office, having charge of the record-books, papers, &c. While I have been in the office, there have been four different Commissioners, viz.: Edmund Burke, Thomas Ewbank, Silas H. Hodges, and Charles Mason.

3. To the third interrogatory, Deponent saith: The Commissioner has been occasionally absent, and when absent the chief clerk has acted in his stead, and performed all the duties of the Commissioner.

4. To the fourth interrogatory, he saith: It would require a laborious examination to ascertain the exact proportion of cases acted on by the chief clerk, while performing the duties of Commissioner; but in my opinion it may fairly be stated at from one-sixth to one-fifth,

embracing patents issued and extended since I have been in the office.

A. B. LITTLE.

Subscribed and sworn to before me, this 2d day of July, 1853.

D. A. HALL, *Commissioner*.

To the Honorable the Circuit Court of the United States, for the District of Massachusetts.

The undersigned Commissioner respectfully reports: That, in obedience to the precept hereto annexed, he did, on the 2d day of July, 1853, at the city of Washington, cause Roger C. Weightman, within named, and Amos B. Little, a clerk in the Patent Office, being the only clerk by the name of Little, in the said office, to come before him, and did propound to them severally the interrogatories to the said Commission annexed, and took their answers to the same, on their respective oaths; and the same did reduce to writing, and cause them to subscribe; which said answers are herewith returned by me.

DAVID A. HALL, *Commissioner*.

UNITED STATES OF AMERICA.

[L. S.]

THE CIRCUIT COURT OF THE UNITED STATES, WITHIN AND FOR THE MASSACHUSETTS DISTRICT.

MASSACHUSETTS DISTRICT, ss.

To Joseph Bridgham, of New York, in the Southern District of New York, Esq., U. S. Commissioner; or Wm. C. Russell, of said New York, Esq.

KNOW YE, that, reposing confidence in your wisdom, prudence, and fidelity, we have appointed, and by these presents do authorize and empower, you to take the answers to the interrogatories hereunto annexed, of Thomas Antisell, William H. Holbrook, Samuel Phillips, M. Leslie, ——— Anderson, Thomas Roney, Robert Vincent, Thomas McMullen, John Wright, Thomas A. Wilson, M. O'Neil, A. Bell, J. Bell, and Alexander Bolton, all of New York aforesaid, witnesses to be examined on behalf of the Complainant, and to be used in a certain cause now pending in said Court, wherein Ross Winans is Plaintiff, in equity, *vs.* The Eastern Railroad Company, Defendants.

And to this end, at certain days to be by you appointed for that purpose, to cause said witnesses, as aforesaid, to be brought before you; and each witness, while present before you, to examine carefully

on oath touching the premises. And, when you shall have taken the examination as aforesaid, to reduce or cause the same to be reduced to writing, and to be subscribed by each of said witnesses, in your presence; and the same, so taken and subscribed, to return, together with this Commission and your doings herein enclosed, sealed, and directed to the Circuit Court aforesaid, holden at Boston, as soon as the same may be executed.

In testimony whereof, we have caused the seal of the said Circuit Court to be hereunto affixed.

Witness, the Honorable Roger B. Taney, at Boston, this fourteenth day of February, in the year of our Lord one thousand eight hundred and fifty-four.

H. W. FULLER, *Clerk*.

N. B. — You shall not, except by consent of the parties in writing, permit either party to attend at the taking of the depositions, either himself, or by any attorney or agent, nor to communicate by interrogatories or suggestions with the Deponents whilst giving their depositions in answer to the interrogatories annexed to this Commission. And you shall take such depositions in a place separate and apart from all other persons, and permit no person to be present during such examination, except the Deponents and yourself, and such disinterested person (if any) as you may think fit to appoint as a clerk, to assist you in reducing the depositions to writing. And you shall put the several interrogatories and cross-interrogatories to the Deponents in their order, and take the answer of the Deponents to each, fully and clearly.

[Depositions to be taken on paper of like size with this Commission.]

UNITED STATES CIRCUIT COURT, }
MASSACHUSETTS DISTRICT. — October Term, 1852. }

ROSS WINANS *vs.* THE EASTERN RAILROAD COMPANY,

IN EQUITY.

Interrogatories to be proposed to Thomas Antisell, William H. Holbrook, Samuel Phillips, M. Leslie, ——— Anderson, Thomas Roney, Robert Vincent, Thomas McMullen, John Wright, Thomas A. Wilson, M. O'Neil, A. Bell, J. Bell, Alexander Bolton, all of New York, on behalf of the Complainant.

(See page 407*.)

1. What is your name, age, residence, and business?
2. Are you acquainted with the eight-wheel railroad-car used on the railroads of this country?
3. Had you knowledge, prior to the year 1835, of that part of the county of Dublin, in Ireland, lying south and east of Dublin city,

including Killiney Hills, Dalkey, and Kingstown Harbor? If yea, state fully what opportunities you had, and when, for acquiring such knowledge.

4. Please state, if you can, when the Dublin and Kingstown Railway was built; and what railways and tramways were located in that vicinity, before the construction of said Dublin and Kingstown Railway; and between what places such railways and tramways extended.

5. If you say there was a tramway from Killiney Hill and Dalkey to Kingstown, please state for what purpose it was constructed and used, and what material or freight was carried on it. What was the nature of the country through which it passed? How long was it, and how large a place was Dalkey, and where was it?

6. Whether or not was there an inclined plane on said tramway? If yea, what was the length of the level parts thereof, above and below said inclined plane respectively, and what was the extent of curvature of said levels?

7. Of what length and width were the bodies of the wagons used on said tramways? and what was the height of that part of the body on which the load rested? Of what size and material were the wheels?

8. How many wheels had each wagon, and at what distance apart were the wheels in each wagon used on said tramway?

9. What kind of motive power was used on said tramway, and at what speed did the wagons move? Was it used for the conveyance of passengers?

10. Under whose supervision and control were the operations on said tramway conducted?

11. Which was the first *railway* constructed for general business in the vicinity of Dublin, and when was it first opened?

12. What do you mean by the word tramway? Wherein does it differ from a railway?

13. Whether or not you have seen upon any railroad, in any country but the United States, such eight-wheeled cars as are used in this country? If yea, where and when did you see such cars, and in what manner were they designated?

C. P. CURTIS, JR., *Solicitor for Complainant.*

UNITED STATES CIRCUIT COURT, }
MASSACHUSETTS DISTRICT. — October 7th, 1852. }

ROSS WINANS vs. THE EASTERN RAILROAD COMPANY.

Cross-interrogatories to Thomas Antisell, William H. Holbrook, Samuel Phillips, M. Leslie, ——— Anderson, Thomas Roney, and others, mentioned in the direct interrogation.

(See page 409*.)

X 1. Will you state the names and termini of all the railroads in England, Scotland, and Ireland, which were built, in whole or in part, in or previously to the year 1830?

X 2. Will you state the length of the radius of the shortest curves which there existed in each one of said railroads?

X 3. Will you state the distance apart of the axles of the cars used on each of said railroads, or the distance apart of the bearing-points of the wheels on rails?

X 4. Can you positively state that there were no eight-wheel cars used on either railroad mentioned by you in your answer to the direct or cross-interrogatories; or do you mean to be understood only that you do not recollect seeing any?

WILLIAM WHITING, *Solicitor of Respondents.*

Depositions of Witnesses, produced, examined, and sworn, before William C. Russell, Commissioner named in the annexed Commission, issued out of and under the seal of the United States Circuit Court, for the Massachusetts District, in a certain suit pending therein, in which Ross Winans is Plaintiff, in equity, and the Eastern Railroad Company Defendant.

STATE OF NEW YORK, }
CITY AND COUNTY OF NEW YORK, ss. }

ON this sixteenth day of February, one thousand eight hundred and fifty-four, before me, William C. Russel, Commissioner named in the annexed Commission, came THOMAS ANTISELL, one of the witnesses named therein, who, being duly sworn and examined upon the interrogatories and cross-interrogatories, to said Commission attached, and pursuant to the instructions therein contained, answers as follows:—

(See page 405*.)

1. To the first interrogatory. My name is Thomas Antisell. I am thirty-seven years of age. I reside in the city of New York, and am a physician and analytical chemist.

2. To the second interrogatory. Yes, I am.

3. To the third interrogatory. I have been acquainted with that district since the year 1826. My father lived in it at Bullock, near Dalkey, about eight miles south-east of Dublin, between Kingstown and Dalkey, from about 1826 to 1832. It was merely a summer residence. From 1832 to 1835 and later, he had a summer residence at Kingstown, or in the neighborhood. I lived at these places every summer, while my father had his summer residence there. I was in the habit of coming to and from Dublin as often as twice a week, while we lived there. As a boy, I was in the habit of travelling about the country in all directions, and I am well acquainted with every spot in it.

4. To the fourth interrogatory. The Dublin and Kingstown Railway was finished about November, 1832. I do not know how long it was in building. Before its construction, there was only one tramway in that vicinity; and that was between Dalkey Hill and Kingstown Harbor. There was no railway in Ireland before the construction of the Dublin and Kingstown Railway.

5. To the fifth interrogatory. Dalkey Hill is one of the Killiney Hills. The tramway from Dalkey Hill to Kingstown Harbor was constructed for the purpose of carrying granite from the quarry at Dalkey Hill to be used in constructing the piers of Kingstown Harbor. Granite alone was carried on it. The country through which it passed was rocky, sterile, and almost entirely uninhabited. There was scarcely a house in sight of it. The tramway was between two miles and a half and three miles long. Dalkey was a hamlet about eleven statute miles south-east of Dublin. It consisted of an old castle in ruins, and a few cottages, inhabited principally by fishermen. This was its condition as late as 1837. The tramway did not commence at the hamlet, but at the quarry, a few hundred yards nearer to Dublin.

6. To the sixth interrogatory. The quarry at Dalkey Hill was situated at a height of somewhere about one hundred and fifty feet above the level of the surrounding country. There was an inclined plane from the quarry, for a distance of about three hundred yards, sloping down to the roadway. The tramway was on that inclined plane. The wagons went down by gravity, and were drawn up by a windlass. The horse was put to the wagon at the bottom.

There was no tramway above the inclined plane. It started from the mouth of the quarry. The length of the level below is the difference between two miles and a half or three miles, and three hundred yards. I do not know the curvatures on the tramway. They were very small. There was no necessity for sharp curves, as the country, though rocky, was quite level, gently sloping from Dalkey Hill to Kingstown, at a grade of about one hundred feet, in the two miles and a half or three miles.

7. To the seventh interrogatory. The bodies of the wagons used on the tramway were about six feet long and about four feet and a half wide. The platform on which the load rested was about two feet at the outside, above the road; between eighteen inches and two feet. There were no sides to the platform; it rested immediately on

the axle to which it was fastened. The wheels were about three feet in diameter, not more; probably five inches thick, of wooden spokes and rims, and iron tires.

8. To the eighth interrogatory. Each wagon had four wheels; two on each side, at the end of axles about four feet apart.

9. To the ninth interrogatory. The wagons descended the inclined plane by their own gravity. At the bottom, a horse was attached to each. That was the motive-power. They moved at the rate of about three miles an hour. The tramway was not used for the conveyance of passengers.

10. To the tenth interrogatory. Under the supervision of the persons who had contracted to supply the stone for the piers.

11. To the eleventh interrogatory. The Dublin and Kingstown Railway was the first railway constructed in Ireland, and was first opened about the first of November, 1832.

12. To the twelfth interrogatory. A tramway is a railway for the conveyance of rough, heavy materials for short distances, such as coals from a pit's mouth, or stone from a quarry. They were so called from Mr. Outram, of Glasgow, who first used them. They differ in nothing from railways, except in their purposes.

13. To the thirteenth interrogatory. I have never seen any eight-wheeled cars, except in the United States. I left Europe in 1848, and have not been there since.

CROSS-EXAMINED.

(See page 407 *.)

X 1. To the first cross-interrogatory. I do not know of any railroad in Great Britain and Ireland which was built in or before 1830, except the two railroads between Liverpool and Manchester. One of them commenced at Liverpool, and went as far as Salford, and, I believe, was called the Liverpool and Salford Railway. The other commenced at Manchester and went as far as Salford, and, I believe, was called the Manchester and Salford Railway.

X 2. To the second cross-interrogatory. I do not know their length.

X 3. To the third cross-interrogatory. On both roads short cars were used, not longer than twenty feet. The axles were about sixteen feet apart. The rails were about four feet and a half apart, which, of course, is the distance of the bearing-points on each axle from one another.

X 4. To the fourth cross-interrogatory. I mean positively to say that there were no eight-wheeled cars on any railway I ever saw, except those in the United States. There were none on either of the three railways I have spoken of.

THOMAS ANTISELL.

Which deposition was taken under oath, reduced to writing, subscribed by witness, and again sworn to, this 16th day of February, A. D. 1854, in presence of

WILLIAM C. RUSSEL, *Commissioner*.

CITY AND COUNTY OF NEW YORK, ss.

ON this eighth day of March, one thousand eight hundred and fifty-four, before me, William C. Russel, Commissioner, named in the annexed Commission, came THOMAS A. WILSON, one of the witnesses therein named, who, being duly sworn and examined upon the interrogatories and cross-interrogatories to said Commission attached, and pursuant to the directions therein contained, answers as follows:—

(See page 405*.)

1. To the first interrogatory. My name is Thomas Alfred Wilson. I am fifty-five years old. I reside in Brooklyn, and I am an insurance-broker by occupation.

2. To the second interrogatory. I am.

3. To the third interrogatory. From 1804 to 1835, I resided at the parish of Ballysonnon, in the county of Kildare, about twenty-five miles south-west of Dublin. Upon an average I went to Dublin once a month, and on those occasions I frequently visited friends who resided at Kingstown. I was, during that period, more than one hundred times at Kingstown. I have frequently been on parties of pleasure to the Killiney Hills, and I have been at Dalkey some twenty or thirty times, before 1835. I consider myself well acquainted with the general outline of the country inquired about.

4. To the fourth interrogatory. To the best of my memory, the Dublin and Kingstown Railway commenced running sometime in 1834. It was built immediately before they commenced running. Before that, there was no railway in Ireland, and only one tramway, and that was between Dalkey Hill and the new harbor at Kingstown. That was the only tramway at that time in Ireland, that I am aware of.

5. To the fifth interrogatory. Dalkey Hill is one of the Killiney Hills, nearest to the harbor of Kingstown. The tramway was constructed for the conveyance of stone from the Killiney Hills to Kingstown Harbor, for the purpose of constructing the piers of the new harbor. Nothing was carried on it but blocks of granite. The country was a wild, uncultivated common, sloping from the quarry to the sea, rough, covered with granite, with patches of green grass between, inhabited principally by fishermen. Dalkey was then but a very insignificant village, with a population, I should think, of not over five hundred persons, at the time the railway commenced to be built, say about 1831. After the building of the railway began, the place improved rapidly. The tramway was about two miles or two miles and a half long, from the hill to the town, to the harbor.

6. To the sixth interrogatory. There was an inclined plane leading from the bottom of the quarry, about two hundred yards, to the tramway to Kingstown. The tramway was on this inclined plane. The windlass, which was worked by a horse, was at the top of the inclined plane. Sometimes more than one horse was required. After being dragged up this inclined plane by horse-power working the windlass, the wagons were then attached to horses, to be drawn on to Kings-

town. The tramway from this point sloped gradually toward Kingstown Harbor; but there was no other inclined plane than what was caused by the natural inequalities of the grade.

There was no level part of the tramway below the inclined plane, on the side toward the quarry. The inclined plane went directly to the bottom of the quarry. Above the inclined plane the length of the tramway was about two miles and a half. It was gently sloping, at a grade of two or three hundred feet in two miles, or two miles and a half. The curvatures must have been very slight. They came by as straight a line as they could come, being only compelled occasionally to avoid rocks by a slight deviation.

7. To the seventh interrogatory. The bodies of the wagons, as nearly as I can recollect, were from six to eight feet long and about four feet and a half wide. The platform on which the load rested, was fifteen or eighteen inches from the ground. The wheels were about a foot in diameter, and were made of cast-iron, so far as I can recollect.

8. To the eighth interrogatory. Each wagon had only four wheels. They were about four feet apart. There was about a foot between each wheel and the end of the car nearest to it, so far as I can recollect.

9. To the ninth interrogatory. The wagons were drawn by horse-power, at a speed of about three miles (Irish) the hour, that is, about three miles and a quarter, English. The tramway was never used for the conveyance of passengers.

10. To the tenth interrogatory. The operations on the tramway were conducted under the supervision and control of the Royal Commissioners, appointed to construct the piers at Kingstown Harbor.

11. To the eleventh interrogatory. The first railway was the Dublin and Kingstown Railway, and was opened in 1834.

12. To the twelfth interrogatory. There is no difference, except that a tramway is a sort of rural road, on which rails are laid down without grading, over any country over which a horse can draw. Horses are used on them, and no other motive-power. Tramways are intended for temporary purposes, and are more roughly built than railways.

13. To the thirteenth interrogatory. I never did.

CROSS-EXAMINED.

(See page 407 *.)

X 1. To the first cross-interrogatory. I do not know what they were in England and Scotland. There was no railway in Ireland in 1830.

X 2. To the second cross-interrogatory. I do not know.

X 3. To the third cross-interrogatory. I do not know.

X 4. To the fourth cross-interrogatory. There was no eight-wheeled car used on any railroad that I ever saw, until I came to this country in 1849. There could not have been any on the Dublin and Kings-

town Railway, without my knowing it. In 1840, 1841, and 1842, I was an annual subscriber or commuter on that railway, and travelled on it every day but Sunday; and it is impossible that an eight-wheeled car could have been in use there without my seeing it.

THOMAS ALFRED WILSON.

Which deposition was taken under oath, reduced to writing, subscribed by witness, and again sworn to, this eighth day of March, A. D. 1854, in presence of

WILLIAM C. RUSSEL, *Commissioner*.

STATE OF NEW YORK, }
CITY AND COUNTY OF NEW YORK, ss. }

ON this fifteenth day of March, one thousand eight hundred and fifty-four, before me, William C. Russel, Commissioner, named in the annexed Commission, came WILLIAM HENRY HOLBROOKE, one of the witnesses therein named, who, being duly sworn and examined upon the interrogatories and cross-interrogatories to said Commission attached, and pursuant to the directions therein contained, answers as follows:—

(See page 405 *.)

1. To the first interrogatory. My name is William Henry Holbrooke; I am about forty-five years old; I reside in the city of New York; and I am an engraver, engineer, artist.

2. To the second interrogatory. No.

3. To the third interrogatory. I knew that district as far back as 1825. From 1825 to 1846 I resided in Dublin, and I frequently walked to Kingstown, Dalkey, and Killiney Hills. I have for several years passed the summers at Dalkey and Kingstown, both before and after 1835; and, before 1835, I have shot over Killiney Hills many seasons.

4. To the fourth interrogatory. The Dublin and Kingstown Railway was built about twenty years ago. I cannot be more positive. It may have been from twenty to twenty-five years. There were no railways nor tramways in that vicinity, before its construction, that I recollect. There may have been temporary tramways for carrying stone, without my observing them. I have an indistinct inkling of such things, but no positive recollection. I think the Dublin and Kingstown Railway was the first we had in Ireland.

5. To the fifth interrogatory. I do not remember any tramway from Dalkey to Kingstown. The country between those places was very rocky, granite formation, with occasional patches of good land between. Its surface was hilly and undulating, bluff on the sea-shore.

Now I remember—I have made a great mistake, and the reason is, that I have been confused by sickness in the family—I now remember distinctly. There is a great work at Kingstown, two piers forming a harbor, which cost a million of pounds sterling. These

piers are built of stones blasted from Killiney Hills, and brought down on a tramway by horse-power, and partly by the impetus of the cars themselves. This tramway led from Killiney Hill to Kingstown Harbor. It was constructed for the purpose of bringing this stone down. Stone only was carried on it. It was from a mile and a half to two miles long. Dalkey was a village of two thousand inhabitants at the outside, I should say. It was two miles from Kingstown, and eight or nine from Dublin. From Dalkey to Kingstown Harbor, the slope was very sudden. I should say that the summit of the hill from which they quarried the stone was at an angle of forty-five degrees with the sea at Kingstown. They took much of the stone from near the summit. It was a slope, or rather a series of slopes, from the hill to Kingstown Harbor.

6. To the sixth interrogatory. The whole tramway from the quarry to the harbor was an inclined plane, mostly natural, though partly probably aided by filling up cavities. The cars descended from the quarry by their own gravity, drawing up the empty cars at the same time, for about two thirds of the distance. There, when the cars reached the level ground near the harbor, the cars were detached from each other, and horses took them down to the piers. The loaded cars drew up, in their descent, the empty ones, by means of chains and pulleys. The same arrangement, too, checked the loaded cars in their velocity, which would otherwise have become too great. I do not know the length of the level parts, above or below the inclined plane, nor the extent of curvature of said levels.

7. To the seventh interrogatory. The platforms of the trucks were about seven feet long, and about four feet and a half wide. The height of the bottom board, on which the stone rested, was about eighteen inches from the ground. The wheels were from twelve to fifteen inches in diameter, and were made of iron or cast-metal.

8. To the eighth interrogatory. I do not recollect how many wheels each truck had, nor at what distance they were apart.

9. To the ninth interrogatory. Gravitation and horse-power were the motive powers used. The speed must have varied. I cannot say what it was. It was certainly slow, compared with that of steam-power. It was not used for the conveyance of passengers.

10. To the tenth interrogatory. Under the control of the Kingstown Harbor Commissioners, appointed by Parliament.

11. To the eleventh interrogatory. The Dublin and Kingstown Railway was the first, and it was opened from twenty to twenty-five years ago.

12. To the twelfth interrogatory. They are both railways. The tramway is generally used for a temporary purpose, and is more rudely constructed, and is travelled by horse-power.

13. To the thirteenth interrogatory. The first I ever saw was in this country.

CROSS-EXAMINED.

(See page 407 *.)

X 1. To the first cross-interrogatory. I cannot recollect them.

X 2. To the second cross-interrogatory. I do not know.

X 3. To the third cross-interrogatory. I do not know them.

X 4. To the fourth cross-interrogatory. I am solemnly impressed with the conviction, that the first time I ever saw an eight-wheeled car was after I came to this country. I certainly never saw one before. I do not mean to say that there was no eight-wheeled car used on any railway I have seen; but my conviction is, that, if there had been, I should have remarked it.

WM. H. HOLBROOKE.

Which deposition was taken under oath, reduced to writing, subscribed by witness, and again sworn to, this 15th day of March, 1854, in presence of

WILLIAM C. RUSSEL, *Commissioner.*

CITY AND COUNTY OF NEW YORK, ss.

ON this ninth day of March, one thousand eight hundred and fifty-four, before me, William C. Russel, Commissioner, named in the annexed Commission, came SAMUEL PHILLIPS, one of the witnesses therein named, who, being being duly sworn and examined upon the interrogatories and cross-interrogatories to said Commission attached, and pursuant to the directions therein contained, answers as follows:—

(See page 405 *.)

1. To the first interrogatory. My name is Samuel Phillips; I am about fifty-three years old; I reside in the city of New York, and keep a lamp-store.

2. To the second interrogatory. I have seen them, I have travelled in them; in that way I am acquainted with them.

3. To the third interrogatory. I have been acquainted with that district of country since 1820. About that time, between 1820 and 1825, the building of the pier at Kingstown was commenced, and I went from Dublin to Kingstown to see it several times. From that time till 1835, I used to visit Kingstown about once a year. From 1830 to 1835, I visited Bullock, near Dalkey, several times. A sister-in-law of mine passed a summer there, and I frequently went down to see her. At one time I was in treaty for a farm under Killiney Hills, near Dalkey, about 1828; and I visited it several times. I am well acquainted with the country, so far as to have seen it very often.

4. To the fourth interrogatory. The Dublin and Kingstown Railway was built, I should think, about 1835 or 1834, somewhere about that time; I do not recollect particularly. I never saw any railway

or tramway in Ireland at all before that railway was built, except a track for running trucks on, carrying the stones to make the Kingstown piers, running from Killiney Hills to the pier. It is called a tramway, metal rails laid down in the streets for cars to run on.

5. To the fifth interrogatory. It was constructed for the purpose of bringing large rocks from the Killiney Hills, and throwing them into the sea, and carrying out the pier. I do not know of any other freight being carried on it. I do not believe that any other was carried on it.

The country was a wild piece at that time, so far as you could see, nearly all rock, an inclined plane down from Killiney Hills. Killiney is an immense hill of granite rock, and the country slopes down from that. Dalkey and Bullock were then places of no note at all, inhabited only by poor people. Dalkey had only a few houses, not more than fifty altogether, and those of poor construction. Bullock was about a mile off, smaller still than Dalkey, composed of fishermen's huts principally.

I do not know the length of the tramway exactly. It was probably about two miles long, not more than that at all events.

6. To the sixth interrogatory. I do not know of any inclined plane being there, except the natural slope of the land. I have been at the hills, and watched them while blasting; but I do not know that I walked along the tramway the whole distance."

7. To the seventh interrogatory. They were about twelve feet long, I should think, and about five feet wide, somewhere about that. They were quite low, about two feet high from the ground, not more than that. The wheels were about two feet in circumference, and were made of metal, cast iron. The wagons were rude, common things, planks nailed together, and wheels placed under them.

8. To the eighth interrogatory. They had not more than four wheels, I believe, and they were four or five feet apart. They may have been five feet apart, but I should think not more than four.

9. To the ninth interrogatory. One horse was used to each wagon; and they moved not faster than a horse could walk, about three miles, Irish, an hour. The tramway was not used for the conveyance of passengers.

10. To the tenth interrogatory. I do not know.

11. To the eleventh interrogatory. The Dublin and Kingstown Railway was the first, and was first opened some time between 1832 and 1835. I cannot recollect more particularly.

12. To the twelfth interrogatory. A tramway is used for carrying stones, gravel, and things of that kind; a railway, for carrying goods and passengers. I do not know any other difference.

13. To the thirteenth interrogatory. I never saw any eight-wheeled cars till I saw them here.

CROSS-EXAMINED.

(See page 407 *.)

X 1. To the first cross-interrogatory. I do not know of any. The Dublin and Kingstown Railway is the first I ever saw.

X 2. To the second cross-interrogatory. I could not say.

X 3. To the third cross-interrogatory. I could not say.

X 4. To the fourth cross-interrogatory. I mean to say that I never saw any, and believe there was not any.

SAML. PHILLIPS.

Which deposition was taken under oath, reduced to writing, and signed by the witness, the 19th day of March, A. D. 1854, in presence of

WILLIAM C. RUSSEL, *Commissioner.*

CITY AND COUNTY OF NEW YORK, ss.

ON this tenth day of March, one thousand eight hundred and fifty-four, before me, William C. Russel, Commissioner, named in the annexed Commission, came THOMAS RONEY, one of the witnesses named therein, who, being duly sworn and examined upon the interrogatories and cross-interrogatories to said Commission attached, and pursuant to the directions therein contained, answers as follows:—

(See page 405 *.)

1. To the first interrogatory. My name is Thomas Roney; I am about thirty-two years old; I reside in the city of New York; and I am a copyist by occupation.

2. To the second interrogatory. I cannot say that I am. I have been on different railroads in this country; but I do not remember how many wheels were attached to the cars.

3. To the third interrogatory. I knew that country well before 1835. I was born in Dublin, and, when a boy, was in the habit of going to Dalkey often. I used to go there when I was ten or twelve years old, and often, as a boy, swam from the Killiney Beach. When I was a child, I often went to Kingstown.

4. To the fourth interrogatory. I do not know when the Dublin and Kingstown Railway was built. There was, before that, a tramway from Dalkey to Kingstown Harbor. There was no other railway in that vicinity before the Dublin and Kingstown Railway.

5. To the fifth interrogatory. It went as far as the quarry at Dalkey, and was constructed for the purpose of conveying the stone from Dalkey Quarry to Kingstown Harbor, to build the piers; stones only were carried on it. The country was not so thickly populated as it is now. Its surface was rocky and hilly, or rather on an inclined

plane from the harbor to the quarry. Dalkey was a small place, and is so still. It was between three and four miles long from the harbor to the quarry; I have walked there in about half an hour or less. The village was about the same distance as the quarry from Kingstown.

6. To the sixth interrogatory. So far as I remember, the whole distance was an inclined plane, easy for horses to go down, following the natural slope of the ground. There was no artificial inclined plane on the tramway that I can remember, none requiring any machinery or ropes, or any thing but horses harnessed to the wagons, to draw them up.

7. To the seventh interrogatory. I do not remember how long the bodies of the wagons were: they were about four or five feet wide. The bottom was about two or three feet from the ground, about two feet, I should think. On further reflection, and after looking at a measuring tape, I think the bottoms were about sixteen inches from the ground. The wheels were small, about fourteen inches in diameter, and were made of iron, cast iron, as well as I recollect.

8. To the eighth interrogatory. Each wagon had four wheels, as nearly as I recollect. The guage of the tramway was four or five feet, and the wheels were from three to four feet apart on each side, as well as I can remember.

9. To the ninth interrogatory. Horses were used, and advantage was taken of the slope in some places to let the wagons run down without horses. The horses walked leisurely down, never out of a walk; but on the slopes the wagons went very fast. There was only one slope that I recollect, but I cannot be positive; that was immediately from the quarry. Down that slope the wagons went by their own force, and they were drawn up by horses. I do not recollect of seeing them drawn up.

10. To the tenth interrogatory. I do not know.

11. To the eleventh interrogatory. Passengers were never carried on the tramway. The first railway for general business in Ireland was the Dublin and Kingstown Railway. I do not know when that was constructed. I think about 1841 or 1842.

12. To the twelfth interrogatory. A tramway does not differ at all from a railway. It is a way laid down for drawing any thing on rails. I am not very positive about it. I consider the city railways to be tramways.

13. To the thirteenth interrogatory. I never observed the cars, and do not know how many wheels they had. I do not know, consequently, whether I ever saw anywhere else such as are used in this country.

CROSS-EXAMINED.

(See page 407*.)

- X 1. To the first cross-interrogatory. I do not know them.
- X 2. To the second cross-interrogatory. I know nothing about it.
- X 3. To the third cross-interrogatory. I know nothing about it.
- X 4. To the fourth cross-interrogatory. I know nothing about it.

THOS. RONEY.

Which deposition was taken under oath, reduced to writing, subscribed by witness, and again sworn to, this 10th day of March, A.D. 1854, in presence of

WILLIAM C. RUSSEL, *Commissioner*.

Specification of Ephraim Morris's Patent. — Exhibit No. 2.

ROSS WINANS *vs.* THE EASTERN RAILROAD COMPANY.

Referred to in the examination of James Murray, in answer to Ques. 49, p. 153, taken before

LEVIN GALE, *Commissioner*.

(Referred to by Hibbard, in Ans. to Ques. 31, p. 54; Mapes, in Ans. to Ques. 38, p. 95; Murray, in Ans. to Ques. 49, p. 153; Knight, in Ans. to Ques. 38, p. 225; Elgar, in Ans. to Ques. 38, p. 239; Latrobe, in Ans. to Ques. 38, p. 253.)

THE schedule referred to in these Letters Patent, and making part of the same, containing a description in the words of the said Ephraim Morris himself, of his improvement in the machine or inclined plane for raising and lowering boats from one level to another on canals.

The improvement consists, *first*, of two water-locks at the head of the inclined plane *vs.* one between each of the railways, their being double ways, for the passage of boats up and down the plane at the same time. *Second*, the position of the machinery, and some improvements in the same. *Third*, the cars, and the manner in which they are drawn up and let down the inclined plane, and the manner in which they are stopped if the chain should break. *First*, these locks are constructed and used in the following manner: They are built of timber directly at the head of the inclined plane, viz.: one between each set of railings, so that they are supported by the walls on which they are built. At the upper end of the locks there are gates communicating with, and opening into, the upper level of the canal, to pass boats in and out, &c. At the lower end of these locks there is but one gate to each lock; this gate is of the width of the lock, and is raised and lowered by the water, as it turns on pivots or its journals

at its lower corners. When the lock is empty this gate lies even with the bottom of the lock, so that the car can pass over it, the lock being deeper at the end where this gate falls than above; this place also permits the water, when let in from above, to flow under and buoy up the gate. At this end of the lock there is a gate in its bottom to let the water out of the same. At the upper end of the lock there is a rise of about nine inches from the bottom of the lock to the bottom of the canal; through the middle of this rise is a hole for the passage of the chain (which draws up the case) to and around the machinery. These locks may be so constructed that the railways may be inside of them; when this is the case, the gates at the lower ends must have the ways placed or built upon them; so that when the car has passed over the gate, and is in the lock, the gate rises with this part of the ways upon it; and, when the gate lowers, the ways, of course, lower with it, and are again ready for the passage of the cars over them. There may be a passage for the water from the canal under the locks, as far down as these lower gates, with a mouth directly under these gates, when they are down; when the water is let into these passages from the canal above, it serves the double purpose of buoying or forcing up the large gates, and also of filling the locks more expeditiously.

The second improvement consists of the position of the machinery, and some improvements in the same. This machinery for drawing up and lowering the cars is placed directly at the head of the plane, and under the canal, the bottom of which is planked over for this purpose; the earth is excavated for a sufficient depth and extent to admit the machinery. Three sides of this excavation are built up with stone-walls, upon which the timbers and plank are laid to support the water of the canal. A space is left in the fourth side for the gudgeon, or end of the shaft of the water-wheel; the pit for which wheel is sunk down at the side of said space. The wheel, around which the chain winds, is on the same level with the bottom of the lock; in this wheel there is a deep groove for the chain to run in. On this he has made this improvement, viz.: On the side of this groove, opposite to each other, the petitioner's wheel has ribs of iron, cast with the whole, which ribs prevent the chain from going to the bottom of the groove, and thus prevent its slipping.

The third improvement of the cars, &c.: Each of these cars have eight wheels, viz.: four on each side of the car, and but four axles or bearing-points; as two of these wheels, by being connected together by means of a short frame, answer the purpose of one wheel; and upon the centre of each of these (frames with two wheels), one of the axles of the car is placed. By means of this contrivance, the railways are relieved; as each wheel must bear its equal proportion, although the ways may be uneven. The upper part of the car to which the four short axles or bearing points are fixed, consists of a strong frame of timber well braced together. From this, a cradle or birth for the boats is suspended by twelve or more iron rods on each side. The bottom of this birth is below the railways and between them, so that the car can descend into the water of the canal at the bottom of the

plane, and receive the boat; and, also, so that this cradle or birth can enter the lock at the head of the plane, while the wheels of the car are on the ways on the outside of the lock (when the locks are built of timber, and within the ways), as mentioned in the first description of the lock. On the top of the car a safety guard is fixed, to stop the car from descending if the chain should break. This guard consists of two iron balls changing on arms, which are fastened to rings, which turn around on an upright shaft. This shaft is connected with one of the wheels of the car; and, turning around with it, the motion of the car causes the balls to expand, and, in case of accident, the increased velocity of the car causes the balls to expand beyond a certain point, when wedges, which are connected with this guard, fall behind the wheels and stop the car.

This contrivance is similar to the governor or regulator used in steam engines. The chain which draws up these cars is attached to the bottom of each car. On this chain, near the car, there is a stopple of oakum or other substance, which draws into the hole at the head of the lock, with the chain, as the car arrives at the summit, and thus the water is prevented from escaping through this hole on to the machinery. The falling gate used at the lower end of these locks (as described above) may be used in the canal above the plane, and in other parts of the canal, to keep the water back in case of break or accident; and also in place of the common canal-gates. They may also be used on the sides of the canal, for waste-gates.

EPHRAIM MORRIS.

Witnesses — J. B. PITT.
SAMUEL PITT.

*Memorandum of Agreement between P. T. JACKSON, President of the
BOSTON AND LOWELL RAILROAD COMPANY, and ROSS WINANS.*

IT is understood by the parties that the said Winans is to render the following services to said company for the term of two years (or more if the company require it), to wit: Said Winans (under the advice and direction of the president of said company) is to give such plans, drawings, instructions, and attendance to workmen, or superintendents who may be employed for the purpose, as will enable them to construct such patterns, wagons, carriages, turnouts, &c., as may be required on said road, agreeable to the best of his ability, and to give such advice and suggestions as he may be capable of doing, relative to all things connected with the said road, to which his attention may be called.

It is at the same time understood that the residence of said Winans is in Baltimore, and that he is rendering similar services to other companies, and that only so much of his personal attentions will be required at the place where the road and cars are constructing, as will enable him to accomplish the object in view. It is also understood

that the company has the privilege of dividing the time above-mentioned into two different periods, during the construction of their work, provided the time intervening shall not be less than one year, and notice be given at the commencement of said intervening time.

The compensation to be received by said Winans for the foregoing services is fifteen hundred dollars per annum, commencing April tenth, A. D. 1832, payable quarterly.

Boston, April 21st, 1832.

(Signed)

P. T. JACKSON,
ROSS WINANS.

The above is a true copy of a document on the files of the Boston and Lowell Railroad Company, in my custody.

J. THOS. STEVENSON,
Treasurer Boston and Lowell Railroad Corporation.

UNITED STATES CIRCUIT COURT.

ROSS WINANS vs. THE EASTERN RAILROAD COMPANY,

IN EQUITY.

This paper admitted without further proof.

WM. WHITING.

THIS INDENTURE, made this sixteenth day of December, in the year of our Lord 1835, between ROSS WINANS, of the city of Baltimore, and State of Maryland, of the first part, and the BOSTON AND LOWELL RAILROAD COMPANY, of the second part.

Whereas, the said Ross Winans has heretofore obtained a patent for a new and useful improvement in the mode of constructing wheels for cars and locomotive engines to be used on railways, dated on the 19th day of November, 1833; and also another patent for a new and useful improvement in the mode of constructing springs for railroad cars, dated on the 14th day of June, 1834; and also another patent for a new and useful improvement in the construction of the axles of railway and other carriages, dated on the 20th day of July, 1831; and also another patent for a new and useful improvement in the construction of cars and carriages intended to run upon railways, usually called the eight-wheel car, dated on the 1st day of Oct. 1834.

And whereas the said party of the first part hath, for the consideration hereinafter mentioned and expressed, agreed to convey unto the said parties of the second part the right to use the said patents, or all or any of them, in the manufacture and construction of all cars and carriages employed by them on their said road from Boston to Lowell, for and during the residue and remainder of the terms of fourteen years thereon yet to come and unexpired.

Now, therefore, this indenture witnesseth that the said party of the

first part, for and in consideration of the sum of \$1,000 current money to him in hand paid, by the said parties of the second part, at and before the sealing and delivery of these presents, the receipt of which is hereby acknowledged, hath given, granted, bargained, and sold, and by these presents doth give, grant, bargain, and sell, unto the said parties of the second part, the right to use the aforesaid patents, and each and every of them, in the manufacture and construction of all cars and carriages employed by them on their said railroad from Boston to Lowell.

To have and to hold the privileges hereby granted, and meant and intended to be so, unto the said parties of the second part, free from the claim, interruption, or hindrance of the aforesaid Ross Winans, his executors, administrators, or assigns.

In testimony whereof, the said party of the first part has hereunto set his hand and seal, on the day and year first above written.

(Signed)

ROSS WINANS. [L. s.]

Signed, sealed, and delivered in presence of

J. A. B. LATIMER,
WM. W. LATIMER.

Acknowledged before

J. A. B. LATIMER, *Notary Public*.

Dec. 16, 1835.

39, COURT-STREET, 22d Dec., 1835.

PATRICK T. JACKSON, Esq.

Dear Sir,— We have just received the enclosed assignment by Mr. Winans, of certain patent rights to the Boston and Lowell Railroad Company, and are authorized to receipt for the \$1,000 stipulated to be paid; and assure you that we are quite happy in being under no further necessity of troubling you on this subject.

Very respectfully,

C. G. & F. C. LORING.

The above are true copies of documents on the files of the Boston and Lowell Railroad Company, in my custody.

J. THOS. STEVENSON,
Treasurer Boston and Lowell Railroad Corporation.

UNITED STATES CIRCUIT COURT.

ROSS WINANS *vs.* EASTERN RAILROAD COMPANY,

IN EQUITY.

These papers admitted without further proof.

WM. WHITING, *Defendant's Solicitor.*

THE UNITED STATES OF AMERICA, }
DISTRICT OF MARYLAND, TO WIT. }

CIRCUIT COURT. — November Term, 1839.

ROSS WINANS *vs.* THE NEWCASTLE AND FRENCHTOWN TURNPIKE AND
RAILROAD COMPANY.

Court's Opinion, given by Chief Justice R. B. Taney.

1. According to the true construction of the Plaintiff's Patent, he claims to be the first inventor of a car with eight wheels, arranged and connected in the manner, and acting upon the principles, stated in his specification, the object of which is to make such an adjustment or arrangement of the wheels and axles, as shall cause the body of the car to pursue a more smooth, even, direct, and safe course, both over the curved and straight parts of a railroad. He does not claim to be the inventor of the eight-wheel car; nor does he claim to be the discoverer of the effect produced by the near and the more remote position of the wheels of an ordinary four-wheeled railroad car. Neither does he claim to be the inventor of a car-body, either for burthen or for passengers, of a new or peculiar construction; nor of any new manner of fixing the car to the steam-engine, or other power, by which it is to be drawn along the road. But he claims, as his invention, the manner of arranging and connecting the eight wheels, as specified in his Patent, for the end above mentioned; and also the connection of a railroad carriage-body with them, adapted either to the transportation of merchandise or of passengers.

2. The two bearing-carriages mentioned in his specification, and the other elements which form portions of the machine which he claims to have invented, being well-known and in common use, it was unnecessary to describe particularly the mode of their construction; and, as he specified what he claims as new, every other mechanical principle or combination which he mentions in his specification, and which form component parts of the machine of which he claims to be the inventor, must, by necessary implication, be considered as admitted to be old, or in use before; and the Patent, therefore, is not invalid, because he has not in express words stated them to be old, nor described the manner of their construction.

3. The Plaintiff has not filed in the Patent Office a disclaimer of any part of the thing patented as new, according to the Act of Congress of March 3, 1837; and he still claims in this suit to be the first inventor of every thing claimed as new in his Patent. If, therefore, the specification therein contained is too broad, and if he there claims to be the first inventor of any improvement or combination which was known and publicly used before, he is not entitled to recover in this action, although some substantial part of the machine, or some new combination of mechanical powers described in the Patent, may have been first invented or discovered by him.

4. The Plaintiff having claimed in his specification, as his inven-

tion, the manner of arranging and connecting the eight wheels of a railroad-carriage, in the manner mentioned in his Patent, for the purpose of enabling burthen and passenger-cars to pursue a more smooth, even, and safe course over the curves and irregularities of a railroad, he is not entitled to recover, if the jury find, from the evidence, that before the time when the Plaintiff claims to have made this discovery, carriages with eight wheels, arranged and connected substantially in the same manner, and upon the same mechanical principles, with those described by the Plaintiff in his Patent, were known and had been publicly used for the purpose of transporting long timber more smoothly, evenly, and safely over the curves and irregularities of the railroad, than could be done in cars of the ordinary construction with four wheels; and the circumstance that these timber-cars were used only for temporary purposes, and were formed by using two ordinary four-wheel cars, with the hind and fore wheels close together, as bearing-carriages, and without any car-body upon them, cannot affect the question now before the Court.

5. If the same combination of the four wheels of each bearing-carriage, and the same manner of arranging and connecting the two bearing-carriages, and the coupling them remotely together by means of the under and upper bolsters, described in the Plaintiff's specification, was in use for the conveyance of timber on the Baltimore and Ohio Railroad, or elsewhere, before the time when the Plaintiff claims to have made this invention; and if the Plaintiff, without the introduction of any new principle or combination in the manner of arranging and connecting the wheels, or any substantial alteration in that respect, applied the same arrangement and connection of the wheels to the construction of cars, or other carriages of eight wheels, intended to run on railroads, he is not entitled to recover; because the application of an old machine to a new use, without any substantial change in its principles or construction or mode of operation, does not entitle the party to a Patent.

6. It is admitted that the car Columbus, of eight wheels, was put upon the Baltimore and Ohio Railroad on the 4th of July, 1831; and, at the time the said car was constructed and put upon the road, the said agreement mentioned in the testimony of Philip E. Thomas was in force, and the Plaintiff was then in the service of the company, performing the duties assigned to him by that agreement. It is also admitted that the car Winchester was put upon the road in March, 1834; the Comet in the summer of the same year; and the Dromedary in the month of August of the same year, each of them being eight-wheel cars; and that, at the time the said three last-mentioned cars were constructed and placed upon the road, the Plaintiff was in the service of the company. That the written agreement of the 11th of February, 1834, between Plaintiff and the said Baltimore and Ohio Railroad Company, which has been offered in evidence, was executed on the day it bears date. It is also admitted that the said four cars, from the time they were placed on the road until the date of the Plaintiff's application for his Patent, were used by the company from time to time, for the transportation of passengers, in the ordinary busi-

ness of the company. If the jury find, from the evidence, that the manner of arranging and connecting the eight wheels which constituted the bearing-carriages of these four cars, with a railroad-car, was substantially the same with that described in Plaintiff's Patent, he is not entitled to recover; because the invention claimed by him was known, and in public use, with his acquiescence, before the time of his application for a Patent. The Court being of opinion that the Act of the 3d of March, 1839, entitled "An Act in addition to an Act to promote the progress of Useful Arts," applies to Patents issued subsequently to its passage, and does not apply to the case before the Court.

THE UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:—

This is to certify, that the annexed is a true copy from the records of this office, of Letters Patent issued to ROSS WINANS, on the first day of October, eighteen hundred and thirty-four, for an improvement in the construction of cars or carriages intended to run on railroads.

In testimony whereof, I, Thomas Ewbank, Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed, this seventh day of April, in the year of our Lord one thousand eight hundred and fifty-two, and of the Independence of the United States the seventy-sixth.

THOS. EWBank.

THE UNITED STATES OF AMERICA.

To all to whom these Letters Patent shall come:—

Whereas ROSS WINANS, a citizen of the United States, hath alleged that he has invented a new and useful improvement in the construction of cars or carriages intended to run upon railroads; which improvement, he states, has not been known or used before his application,—hath sworn that he does verily believe that he is the true inventor or discoverer of the said improvement; hath paid into the Treasury of the United States the sum of Thirty Dollars, delivered a receipt for the same, and presented a petition to the Secretary of State, signifying a desire of obtaining an exclusive property in the said improvement, and praying that a Patent may be granted for that purpose: These are, therefore, to grant, according to law, to the said Ross Winans, his heirs, administrators, or assigns, for the term of fourteen years, from the first day of October, one thousand eight hundred and thirty-four, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement; a description whereof is given in the words of the said Ross Winans himself, in the schedule hereto annexed, and is made a part of these presents.

In testimony whereof, I have caused these Letters to be made Patent, and the seal of the United States to be hereunto affixed.

Given under my hand at the city of Washington, this first day of October, in the year of our Lord one thousand eight hundred and thirty-four, and of the Independence of the United States of America the fifty-ninth.

By the President,

ANDREW JACKSON.

JOHN FORSYTH, *Secretary of State.*

CITY OF WASHINGTON, TO WIT:

I do hereby certify, that the foregoing Letters Patent were delivered to me on the first day of October, in the year of our Lord one thousand eight hundred and thirty-four, to be examined; that I have examined the same, and find them conformable to law: and I do hereby return the same to the Secretary of State, within fifteen days from the date aforesaid, to wit, on this first day of October, in the year aforesaid.

B. F. BUTLER,

Attorney General of the United States.

Certificate of Extension.

WHEREAS, upon the petition of Ross Winans, of Baltimore, Md., for an extension of the within patent granted to the said Ross Winans on the first day of October, 1834, the undersigned Acting COMMISSIONER OF PATENTS, under the 18th section of the Act of Congress, approved the 4th day of July, 1836, entitled "An Act to promote the progress of the useful arts, to repeal all acts heretofore made for that purpose," and the act approved 27th May, 1848, entitled "An Act to provide additional examiners in the Patent Office, and for other purposes," did, on the 25th day of September, 1848, certify that said patent ought to be extended.

Now, therefore, I, HENRY H. SYLVESTER, acting Commissioner of Patents, by virtue of the power vested in me by said acts of Congress, do renew and extend said patent, and certify that the same is hereby extended for the term of seven years, from and after the expiration of the first term; viz. the first day of October, 1848, which certificate on the petition of the applicant, together with this certificate of the acting COMMISSIONER OF PATENTS, having been duly entered of record in the Patent Office, the said patent now has the same effect in law as though the same had been originally granted for the term of *twenty-one years.*

In testimony whereof, I have caused the SEAL OF THE PATENT OFFICE to be hereunto affixed, this twenty-fifth day of September, in the year of our Lord one thousand eight hundred and forty-eight, and of the Independence of the United States the seventy-third.

HENRY H. SYLVESTER,

Acting Commissioner of Patents.

SCHEDULE "A."

*The Schedule referred to in these Letters Patent, and making part 10
of the same, containing a description, in the words of the said
ROSS WINANS himself, of his improvement in the construction
of Cars or Carriages, intended to run upon Railroads.*

To all whom it may Concern:— Be it known, that I, Ross 11
WINANS, civil engineer, of the city of Baltimore, in the State
of Maryland, have invented a new and useful improvement in
the construction of cars or carriages, intended to travel upon
railroads; which improvement is particularly adapted to pas-
senger cars, as will more fully appear by an exposition of the
difficulties heretofore experienced in the running of such cars
at high velocities, which exposition I think it best to give in
this specification, for the purpose of exemplifying the more
clearly the object of my said improvement.

In the construction of all railroads in this country, which 12
extend to any considerable distance, it has been found necessary
to admit of lateral curvatures, the radius of which is sometimes
but a few hundred feet; and it becomes important, therefore, so
to construct the cars, as to enable them to overcome the diffi-
culties presented by such curvatures, and to adapt them for
running with the least friction practicable, upon all parts of the
road. The friction to which I now allude is that which arises
from the contact between the flanches of the wheels and the
rails, which, when it occurs, causes a great loss of power and a
rapid destruction of, or injury to, both the wheel and the rail,
and is otherwise injurious.

The high velocities attained by the improvements made in 13
locomotive engines, and which are not only sanctioned but
demanded by public opinion, render it necessary that certain
points of construction and arrangement, both in the roads and
wheels, which were not viewed as important at former rates of
travelling, should now receive special attention. The greater
momentum of the load and the intensity of the shocks and
concussions, which are unavoidable, even under the best con-
structions, are among those circumstances which must not be
neglected, as the liability to accident is thereby not only greatly
increased, but the consequences to be apprehended much more
serious.

- 14 The passenger and other cars in general use upon railroads have four wheels, the axles of which are placed from three and a half to five feet apart; this distance being governed by the nature of the road upon which they run, and other considerations.
- 15 When the cars are so constructed that the axles retain their parallelism, and are at a considerable distance apart, there is a necessary tendency in the flanches of the wheels to come into contact with the rails, especially on the curvatures of least radius, as the axles then vary more from the direction of the radii. From this consideration, when taken alone, it would appear to be best to place the axles as near to each other as possible, thus causing them to approach more nearly to the direction of the radii of the curves and the planes of the wheels to conform to the line of the rails.
- 16 There are, however, other circumstances which must not be overlooked in their constructions. I have already alluded to the increased force of the shocks from obstructions at high velocities; and, whatever care may be taken, there will be inequalities in the rails and wheels, which, though small, are numerous, and the perpetual operation of which produces effects which cannot be disregarded. The greater the distance between the axles, while the length of the body remains the same, the less is the influence of these shocks or concussions; and this has led, in many instances, to the placing them in passenger cars, at or near their extreme ends. Now, however, a compromise is most commonly made between the evils resulting from a considerable separation and a near approach, as, by the modes of construction now in use, one of the advantages must be sacrificed to the other.
- 17 But it is not to the lateral curvatures and inequalities of the road alone that the foregoing remarks apply. The incessant vibration felt in travelling over a railroad is mainly dependant upon the vertical motion of the cars, in surmounting those numerous though minute obstructions which unavoidably exist. The nearer the axles are placed to each other, the greater is the effect of this motion upon the passengers, and the greater its power to derange the machinery and the road. It becomes very important, therefore, both as regards comfort, safety, and economy, to devise a mode of combining the advantages derived from placing the axles at a considerable distance apart, with those of allowing them to be situated near to each other.
- 18 It has been attempted, and with some success, to correct the tendency of the flanches to come into contact with the rails on

curved and other parts of the road, by making the tread of the wheel conical; and, if the travelling upon railroads was not required to be very rapid, this would so far prove an effectual corrective, as the two rails would find diameters upon the wheels which would correspond with the difference in length, the constant tendency to deviation being as constantly counteracted by this construction; but, at high velocities, the momentum of the body in motion tends so powerfully to carry it in a right line, 19 as to cause the wheel on the longer rail to ascend considerably above that part of the cone which corresponds therewith. The consequence of this is a continued serpentine motion, principally, but not entirely, in a lateral direction; nor is this confined to the curved parts of the road, but it exists to an equal or greater extent upon those which are straight, especially when the axles are near to each other, the irregularities before spoken of constantly changing the direct course of the wheels, whilst there is no general curvature of the rails to counteract it. To avoid this effect, and the unpleasant motion and tendency to derangement consequent upon it, an additional motive is furnished for placing the axles at a considerable distance apart.

The object of my invention is, among other things, to make 20 such an adjustment or arrangement of the wheels and axles, as shall cause the body of the car or carriage to pursue a more smooth, even, direct, and safe course, than it does as cars are ordinarily constructed, both over the curved and straight parts of the road, by the before-mentioned desideratum of combining the advantages of the near and distant coupling of the axles and other means to be hereinafter described.

For this purpose, I construct two bearing carriages, each with 21 four wheels, which are to sustain the body of the passenger or other car, by placing one of them at or near each end of it, in a way to be presently described. The two wheels on either side of these carriages are to be placed very near to each other: the spaces between their flanches need be no greater than is necessary to prevent their contact with each other. These wheels I connect together by means of a very strong spring, — say double the usual strength employed for ordinary cars, — the ends of which springs are bolted, or otherwise secured, to the upper sides of the boxes, which rest on the journals of the axles; 22 the longer leaves of the springs being placed downwards, and surmounted by the shorter leaves. Having thus connected two pairs of wheels together, I unite them into a four-wheel bearing carriage, by means of their axles and a bolster of the proper

length, extending across between the two pairs of wheels from the centre of one spring to that of the other, and securely fastened to the tops of them. This bolster must be of sufficient strength to bear a load upon its centre of four or five tons. Upon this first bolster I place another of equal strength, and connect the two together by a centre pin or bolt, passing down through them, and thus allowing them to swivel or turn upon each other in the manner of the front bolster of a common road wagon. I prefer making these bolsters of wrought or cast iron: wood, however, may be used. I prepare each of the bearing carriages in precisely the same way.

- 23 The body of the passenger or other car I make of double the ordinary length of those which run on four wheels, and capable of carrying double their load.

This body I place so as to rest its whole weight upon the two upper bolsters of the two before-mentioned bearing carriages or running gear. I sometimes place these bolsters so far within the ends of the body of the car as to bring all the wheels under it; and, in this case, less strength is necessary in the car-body, than when the bolster is situated at its extreme ends. In some cases, however, I place the bolster so far without the body of the car, at either end, as to allow the latter to hang down between the two sets of wheels, or bearing carriages, and to run, if desired, within a foot of the rails.

- 24 When this is done, a strong frame-work projects out from either end of the car or carriage body, and rests upon the upper bolsters of the two bearing carriages. This last arrangement, by which the body of the car is hung so low down, manifestly affords a great security to the passengers, exempting them in a great degree from those accidents to which they are liable when the load is raised. Several bodies may be connected, or rest on a common frame, and be supported on the bearing carriage, in a manner similar to that of a single body.

- 25 When the bolsters of the bearing carriages are placed under the extreme ends of the body, the relief from shocks and concussions, and from lateral vibrations, is greater than it is when the bolsters are placed between the middle and the ends of the body; and this relief is not materially varied by increasing or diminishing the length of the body, while the extreme ends of it continue to rest on the bolsters of the bearing cars, the load being supposed to be equally distributed over the entire length of the body.

- 26 Although I prefer the use of a single spring to a pair of wheels as above described, instead of the ordinary spring to each

wheel, and consider it as more simple, cheap, and convenient, than any other arrangement; the end which I have in view may, nevertheless, be obtained by constructing the bearing carriages in any of the modes usually practised, provided that the fore and hind wheels of each of them be placed very near together; because the closeness of the fore and hind wheels of each bearing carriage, taken in connection with the use of two bearing carriages coupled remotely from each other as can conveniently be done, for the support of one body, with a view to the objects and on the principles herein set forth, is considered 27 by me as a most important feature of my invention; for by the contiguity of the fore and hind wheels of each bearing carriage, while the two bearing carriages may be at any desirable distance apart, the lateral friction from the rubbing of the flanches against the rails is most effectually avoided, whilst, at the same time, all the advantages attendant upon placing the axles of a four-wheeled car far apart are thus obtained.

The bearing of the load on the centre of the bolster, which 28 also is the centre of each bearing carriage, likewise affords great relief from the shocks occasioned by the percussions of the wheels on protuberant parts of the rails, or other objects, and from the vibrations consequent to the use of coned wheels; as the lateral and vertical movements of the body of the car resulting from the above causes are much diminished. The two wheels on either side of one of the bearing carriages may, from their proximity, be considered as acting like a single wheel; and as these two bearing carriages may be placed at any distance from each other, consistent with the required strength of the body of the car, it is evident that all the advantage is obtained which results from having the two axles of a four-wheeled car at a distance from each other, whilst its inconveniences are avoided.

Another advantage of this car compared with those in com- 29 mon use, and which is viewed by me as very important, is the increased safety afforded by it to passengers; not only from the diminished liability to breakage, or derangement in the frame work, but also from the less disastrous consequences to be apprehended from the breaking of a wheel, axle, or other part of the running gear, as the car-body depends, for its support and safety, upon a greater number of wheels, and bearing points on the road.

I do not claim, as my invention, the running of cars or car- 30 riages upon eight wheels, this having been previously done; not, however, in the manner or for the purposes herein described, but merely with a view of distributing the weight carried, more

evenly upon a rail, or other road, and for objects distinct in character from those which I have had in view, as hereinbefore set forth. Nor have the wheels, when thus increased in number, been so arranged and connected with each other either by design or accident, as to accomplish this purpose. What I claim, therefore, as my invention, and for which I ask a patent, is the before-described manner of arranging and connecting the eight wheels which constitute the two bearing carriages with a railroad car, so as to accomplish the end proposed by the means set forth, or by any others which are analogous and dependent upon the same principles.

ROSS WINANS.

Witnesses—G. BROWN,
JNO. H. B. LATROBE.

References to the annexed Drawings of Ross Winans' improvement in the construction of Cars or Carriages intended to run on Railroads, for which Letters Patent were issued, dated October 1st, 1834.

Fig. 1. — Side view of an eight-wheel car.

Fig. 2. — End view of the same.

Fig. 3. — Upper and lower bolster detached from the body and bearing-carriage.

A A — Represents the body of the car resting on the bearing-carriages B and C, as exhibited at D D, on pivots equidistant from the wheels of each bearing-carriage.

H — Represents an upper bolster of cast-iron, separate from the body of the car with its pivot X corresponding with the socket Y in the lower bolster E, also shown as separate from the bearing-carriage.

STATE OF MARYLAND, }
BALTIMORE CITY, ss. }

On this nineteenth day of November, in the year eighteen hundred and thirty-eight, before me the subscriber, a Justice of the Peace of the said State in and for the said city, personally appeared Ross Winans, and made solemn oath that he is the inventor of an improvement in the construction of cars or carriages intended to run on railroads, for which Letters Patent of the United States were granted to him, dated the first day of October, 1834; and that the annexed drawing is, as he verily believes, a true delineation of the invention, as described in the said Letters Patent.

Sworn before

JAMES BLAIR, *Justice of Peace.*

UNITED STATES OF AMERICA.

[L. S.]

THE CIRCUIT COURT OF THE UNITED STATES, WITHIN AND FOR THE MASSACHUSETTS
DISTRICT.

MASSACHUSETTS DISTRICT, ss.

To Benjamin F. Watson, Esq., of Lawrence, in said District.

KNOW YE, that, reposing confidence in your wisdom, prudence, and fidelity, we have appointed, and by these presents do authorize and empower, you to take the answers to the interrogatories hereunto annexed, of Peter Clark of Andover, and Adin Holbrook of Lowell, Massachusetts, witnesses to be examined on behalf of the Complainant, and to be used in a certain cause now pending in said Court, wherein Ross Winans is Plaintiff, in equity, *vs.* The Eastern Railroad Company, Defendants.

And to this end, at certain days to be by you appointed for that purpose, to cause said witnesses, as aforesaid, to be brought before you; and each witness, while present before you, to examine carefully on oath touching the premises. And, when you shall have taken the examination as aforesaid, to reduce or cause the same to be reduced to writing, and to be subscribed by each of said witnesses in your presence; and the same, so taken and subscribed, to return, together with this Commission and your doings herein, enclosed, sealed, and directed to the Circuit Court aforesaid, holden at Boston, as soon as the same shall have been executed.

In testimony whereof, we have caused the seal of the said Circuit Court to be hereunto affixed.

Witness, the Honorable Roger B. Taney, at Boston, this twentieth day of June, in the year of our Lord one thousand eight hundred and fifty-three.

H. W. FULLER, *Clerk.*

N. B. — You shall not, except by consent of the parties in writing, permit either party to attend at the taking of the deposition, either himself, or by any attorney or agent, nor to communicate by interrogatories or suggestions with the Deponent whilst giving his deposition in answer to the interrogatories annexed to this Commission. And you shall take such deposition in a place separate and apart from all other persons, and permit no person to be present during such examination, except the Deponent and yourself, and such disinterested person (if any) as you may think fit to appoint as a clerk, to assist you in reducing the deposition to writing. And you shall put the several interrogatories and cross-interrogatories to the Deponent, in their order, and take the answer of the Deponent to each, fully and clearly.

[N. B. — Depositions to be taken on paper of like size with this Commission.]

UNITED STATES CIRCUIT COURT, }
 MASSACHUSETTS DISTRICT. — October Term, 1852. }

ROSS WINANS vs. THE EASTERN RAILROAD COMPANY,

IN EQUITY.

Interrogatories to Peter Clark of Andover, and Adin Holbrook of Lowell, Massachusetts, on behalf of the Complainant.

1. What is your name, age, and residence? What is, and has been, your occupation?

2. Do you know Ross Winans, the Complainant? If yea, how long have you known him, and what intercourse have you had with him? and where and when, and in relation to what subjects, have you had the same?

3. Whether or not have you been concerned in the preparation and working of any railroads, or the machinery used thereon? If yea, in what capacity were you so concerned, and upon what railroads, and when?

4. Do you know when the use of the eight-wheeled cars, now used on the railroads in this country, first commenced? If yea, when? and state your means of knowledge.

5. What number of wheels had the cars used upon the railroads in the vicinity of Boston, Massachusetts? and what was the average speed of passenger and freight trains, before the use of the said eight-wheel cars commenced thereon? What is the average speed at the present day?

6. Whether or not you were, in the year 1838, engaged in preparing a railroad in the vicinity of Boston, and its machinery, for operation? If yea, what was the name of said road, in what part of said year, and in what capacity were you so engaged?

7. If you say you were so engaged, please state whether or not you examined the construction and mode of operation of eight-wheeled cars used on other railroads? If yea, for what purpose or to what end did you examine them? and by whom, and upon what plans, were the said cars examined by you, constructed?

[Objected to, unless the witnesses know of their own knowledge, and not from information derived from others.]

8. Whether or not you obtained from the builder of said cars so examined by you, a proposition to furnish similar cars? and, if yea, what were the terms of such offer, as you recollect them?

[Objected to, as inadmissible.]

9. If you made proposals to any other car-builders, respecting the construction of eight-wheeled cars for said road, please state to whom you so proposed, what agreement you made with them, and what, if any thing, they did to qualify themselves to furnish eight-wheeled cars

for said road. If the said agreements were in writing, please annex them, or copies, to your deposition; and, if you cannot, state why.

[Objected to, as inadmissible.]

10. If you state that contracts were made for said eight-wheel cars with any parties, state why said contracts were made with them in preference to others; and whether or not the privilege of using or making the said cars was made a matter of specific compensation in said contracts; and, if yea, how much was paid therefor?

[The first part objected to, as inadmissible.]

11. Whether or not was any compensation paid by you, or to your knowledge, by said railroad company, for the privilege of using the said eight-wheeled cars upon the said road? and, if yea, how much, and to whom was it paid?

12. What degree of attention did the said eight-wheeled cars excite among those conversant with railroads, and among the public, when they were first introduced upon said road? and what was the general opinion in regard to them? State fully.

[Objected to as hearsay, and as otherwise inadmissible.]

13. What effect has the eight-wheeled car had upon the safety of passengers, and the speed of the trains upon railroads with which you have been connected, and whose rates of speed you are acquainted with?

[Objected to, as irrelevant and inadmissible.]

14. How many four-wheeled, and how many eight-wheeled, cars were placed upon the said first-mentioned railroad, through your agency, and for what purposes? If four-wheeled cars are now used on said road, state for what purposes and to what extent.

15. Whether or not did the railroad companies about Boston substitute eight-wheeled passenger-cars for four-wheeled? and, if yea, how soon after the introduction of the same by you on the said road did they do so?

[Objected to, as leading.]

C. P. CURTIS, JR., *for Complainant.*

ROSS WINANS vs. THE EASTERN RAILROAD COMPANY.

Cross-interrogatories to Peter Clark of Andover, and Adin Holbrook of Lowell, Massachusetts, on behalf of the Respondents.

X 1. If, in answer to the fourth interrogatory, you say *when* the use of the eight-wheeled car first commenced, will you state whether you know the facts of your own personal knowledge, or by information derived from others? and whether you know, of your own personal knowledge, the date at which the eight-wheel car mentioned by you

was first introduced on to the Quincy Railroad, the Baltimore and Ohio Railroad, or any of the railroads in South Carolina or New York? Will you give the dates on which said car was introduced on to each of the roads, and on any other roads mentioned by you, in your answer?

X 2. Will you state the names of all the railroads you have referred to, in your answer to said fourth interrogatory?

X 3. How do you know the facts, if any, stated in your answer to the fifth interrogatory?

X 4. (*De bene esse*.) If you answer the seventh interrogatory affirmatively, how do you know, of your own knowledge, upon whose plans said cars were constructed? What were said plans, whether in writing or drawing? and will you state where they were, in whose possession at the time said cars were built; when they were in such possession; where, and in whose possession, said plans now are? and will you annex the same, or a faithful copy thereof, to your answer? and can you swear that the cars made were in exact accordance with said plans? and, if not so, wherein did they differ?

X 5. (*De bene esse*.) If you say any compensation was paid, in answer to the eleventh interrogatory, will you state when it was paid, by and to whom, and whether upon any written agreement? If so, annex the same, or a copy thereof, to your answer.

Attest,

H. W. FULLER, *Clerk*.

Deposition of Adin Holbrook.

(*See page 434 *.*)

1. My name is Adin Holbrook; my age is seventy-three years, and I reside in Lowell, Mass. Have been mechanic ever since I was sixteen years old. Have superintended the building of several manufacturing establishments. Have been railroad-director, and superintended the building of bridges. My occupation now is covering rolls for manufacturing companies.

2. I do not know Ross Winans, the Complainant. I have never, to my knowledge, had any intercourse with him.

3. I have had but little, if any thing, to do with the preparation and working of any railroad, or the machinery used thereon. I was a director on the Nashua and Lowell Railroad, very soon after it commenced operations, and remained as a director only a short time after it commenced running trains. I had very little to do with it, however.

4. I do not know when the eight-wheeled cars spoken of were first used; but about eighteen years ago, I should think, or at the commencement of the Nashua Railroad, in company with Peter Clark, I went to Philadelphia, for the purpose of finding some plan for cars for that road. While in that vicinity, I first saw an eight-wheeled car, which suited us. On our return, we introduced that style of cars on

to the Nashua and Lowell Road. I don't recollect the builder's name; they were called Baltimore cars.

5. So far as I know, the cars used upon the railroads in the vicinity of Boston, before the introduction of the eight-wheeled cars, had only four wheels. I cannot speak positively as to the speed at that time or at the present day.

6. All I ever had to do with any railroad was with the Nashua and Lowell. I might have been engaged on that in the year 1838, but I do not remember distinctly. I have before stated that it was in the capacity of a director.

7. I examined the construction and mode of operation of eight-wheeled cars. I examined them for the purpose of getting some made, and of introducing them on the Nashua and Lowell Railroad. I cannot positively say by whom they were constructed. I believe the man's name was Myers, but I am not positive. I should say the plans were the same then as now used; there are some slight alterations, but I should judge the principle of the present cars to be the same as those I first saw at Philadelphia.

8. I did obtain a proposition from said builder to furnish similar cars; and he did build and furnish them for the Nashua and Lowell Railroad. I cannot recollect any of the terms of his offer.

9. I have no remembrance of having made proposals to any other car-builder, respecting the construction of eight-wheeled cars for said road. I had some talk with a car-builder in Philadelphia, respecting it, but no bargain was made; and I don't recollect his name. I think the agreement with Myers (if that be the name) was in writing. It is not in my keeping. I presume it is among the papers of the Nashua and Lowell Railroad.

10. Contracts were made with said person in preference to any other because we liked him best, I presume; for I do not recollect any other reason. I do not recollect whether the privilege of making or using said cars was, or was not, made a matter of specific compensation in said contract. My memory does not serve me upon the particulars inquired of; it having occurred so long since, and I having been interested in other business.

11. I have no knowledge of any thing ever having been paid by me, or by said road, for the privilege of using said eight-wheeled cars.

12. The attention of people was generally excited upon the merits of the car, in respect to its being more commodious, and capable of turning a shorter curve. The general opinion was, that it was a great improvement in the respects I have mentioned, as well as generally.

13. I should think it is safer than the four-wheeled cars. I can't say, from knowledge, whether it has increased the speed or not.

14. I cannot tell how many four-wheeled, or how many eight-wheeled, cars were placed upon said road, through my agency. I do not know that any four-wheeled cars are now used on said road. There may be some four-wheeled old freight-cars used; but there are none used for passengers, to my knowledge.

15. I think the railroad companies about Boston were introducing

eight-wheeled cars about the same time we introduced them on said road. They were using eight-wheeled cars about the time I went to Philadelphia; but they were made in a very bungling manner, which did not suit me. The strengthening of the body was by iron rods. When we introduced ours, they changed the plan they were using for that which we had introduced; and I think they continue to use the same now.

Answers of Adin Holbrook to Cross-interrogatories put on behalf of the said Respondents.

(See page 435 *.)

X 1. I do not know the date when the eight-wheeled car was first used, except as before stated. I do not know any thing about its use on the Quincy Railroad, or on the Baltimore and Ohio Railroad, or on any of the roads in South Carolina or New York. I first saw them on the road between Philadelphia and Baltimore. I have already given the date of its introduction on to the Nashua and Lowell, as nearly as I can recollect. I know nothing in that respect as to the other roads.

X 2. I have so stated the names of all railroads referred to, in answer to fourth direct interrogatory, in said answer.

X 3. I know what I have stated, in my answer to the fifth direct interrogatory, by personal observation.

X 4. In my answer to the seventh direct interrogatory, I did not, and do not, wish to refer to any plans on paper at all; for I do not recollect of any. I refer to the general appearance of the cars, as at present used. I do not wish to be understood as saying, that, in every particular, the plan of the cars which we then introduced agrees with those now in use; but, so far as I can remember and judge, they agreed generally.

X 5. I do not say that any compensation was paid.

ADIN HOLBROOK.

COMMONWEALTH OF MASSACHUSETTS, }
 ESSEX, ss. }

Subscribed and sworn to by the aforesaid Adin Holbrook, this day, before me,

B. F. WATSON, *Justice of the Peace.*

LAWRENCE, July 21, 1854.

COMMONWEALTH OF MASSACHUSETTS, }
Essex, ss. }

ROSS WINANS, PLAINTIFF,

vs.

THE EASTERN RAILROAD COMPANY, DEFENDANTS,

IN EQUITY.

The Deposition of Adin Holbrook.

On the twenty-first day of July, in the year of our Lord one thousand eight hundred and fifty-three, the aforesaid Deponent personally appeared before me, the subscriber, at Lawrence, in said county; and he, being first cautioned and sworn to speak the truth, the whole truth, and nothing but the truth, gave the foregoing deposition by him subscribed in my presence; and the same was by me reduced to writing in his presence. Said deposition was taken in a place separate and apart from all other persons; no person being present, excepting said Deponent and myself. The accompanying interrogatories and cross-interrogatories were each, in their order, put to said Deponent, and each, in its order, was answered; and the answer reduced to writing before the next succeeding interrogatory or cross-interrogatory was made known to the Deponent.

Taken at the request of the Complainant, and to be used in the above entitled suit now pending in the Circuit Court of the United States of America, within and for the District of Massachusetts.

B. F. WATSON, *Justice of the Peace.*

I have not been able to secure the attendance of Peter Clark, either by reason of my notice not reaching him, or for some other reason. Therefore I am unable at this time to return his deposition.

B. F. WATSON.

JUDGMENT RECORD.

THE SCHENECTADY AND TROY RAILROAD COMPANY
adsm. ROSS WINANS.

NORTHERN DISTRICT OF NEW YORK—SS.

The Schenectady and Troy Railroad Company were summoned to answer Ross Winans in a plea of trespass on the case, and thereupon Ross Winans, by Hamilton Harris, his Attorney, complains of the Schenectady and Troy Railroad Company in a plea of trespass on the case. For that, whereas the said Plaintiff, so being a citizen of the United States as aforesaid, and being the original and first inventor of a new and useful improvement in the construction of cars or carriages intended to run upon railroads, which was not known or used before his invention, and which, at the time of his application for a patent, as hereinafter mentioned, was not in public use or on sale, with his consent or allowance, and thereupon heretofore, to wit, on the 1st day of October, 1834, at the City of Washington, to wit, at the city of Albany, in the county of Albany, and in the said Northern District of New York, upon the application of the said Plaintiff to the Secretary of State of the United States, letters patent were duly issued in the name of the United States, under the seal of the United States, signed by the President of the United States, and by the Secretary of State of the United States, to which was subjoined a certificate of the Attorney General of the United States, that on the 1st day of October, 1834, he had examined the said letters patent, and that the same were conformable to law, which said letters patent, bearing date the same day and year last aforesaid, duly signed, issued, recorded and tested as aforesaid, according to the form of the statute in such case made and provided, the said Plaintiff now brings here into Court, wherein and whereby was granted to the said Plaintiff, his heirs, administrators or assigns, for the term of fourteen years from the said 1st day of October, 1834, the full and exclusive right and liberty of making, constructing, using and vending to others to be used, the said improvement, a description whereof in the words of the said Plaintiff himself, is contained in a schedule or specification annexed to the said letters patent, and forming part thereof of the tenor and import following, to wit: (For Specification see pp. 3—427*.)

As by reference to the said schedule or specification annexed to the said letters patent, and which the said Plaintiff now brings here into

Court, will more fully appear ; and the said Plaintiff in fact further says, that, by means of the said letters patent, he, the said Plaintiff, became and was at the time of the committing of the grievances hereinafter mentioned, to wit, the 1st day of July, 1846, entitled to the exclusive right and liberty of making, constructing, using and vending to others to be used, the said improvement in the construction of cars or carriages intended to run upon railroads, in the said letters patent specified, for the term of years specified in the said letters patent, which said exclusive right and liberty has been, and now is, of great value to him, the said Plaintiff, to wit, of the value of \$20,000.

Yet the said Defendant, well knowing the premises, but contriving and wrongfully intending to injure the said Plaintiff, and to deprive him of the profits, benefit and advantages which he might, and otherwise could have derived and acquired from the exclusive right and liberty aforesaid, did, on the 1st day of July, 1846, and on divers other days and times before and afterwards, and during the said term of fourteen years mentioned in the said letters patent, and which the said Plaintiff was so entitled to the said exclusive right and liberty as aforesaid, and before the commencement of this suit, to wit, at Troy, in the said Northern District of New York, unlawfully and unjustly, and without the consent or allowance, and against the will of the said Plaintiff, having previously made, or caused to be made, the said new and useful invention, did use the same and put the same in practice in breach of the aforesaid letters patent, and in violation and infringement of the right, privilege and liberty, so as aforesaid granted to the said Plaintiff, and contrary to the form and effect of the statute in such case made and provided, whereby the said Plaintiff has been injured and deprived of great profits and advantages which he might, and otherwise he would, have received from said invention, and has sustained actual damage to the amount of \$5000, and by force of the statutes aforesaid, an action has accrued to the said Plaintiff to recover the said actual damages and such additional amount, not exceeding in the whole three times the amount of such actual damage as the Court may see fit to order and adjudge, and therefore the said Plaintiff brings suits, &c.

And the said Defendants the Schenectady and Troy Railroad Company, by Robert Christie, Jr., their attorney, come and defend the wrong and injury, when, &c., and say that they are not guilty of the several grievances laid to their charge in the declaration of the Plaintiff, in this cause in manner and form as is therein alleged, and of this they put themselves upon the country, and the said Plaintiff does the like, &c.

And it is suggested to the said Court, before the Judges thereof, that the said Defendants, under their said plea aforesaid, gave notice of special matter as follows, viz :

* The numbers with a Star (*) indicate Complainant's folios.

UNITED STATES CIRCUIT COURT.

NORTHERN DISTRICT OF NEW YORK.

THE SCHENECTADY AND TROY RAILROAD COMPANY, *ads.* ROSS WINANS.

SIR :—On the trial of the above cause, the Defendant, under the plea of the general issue heretofore served on you, will give in evidence pursuant to the statute in such case made and provided, that the alleged improvement in the construction of cars or carriages, intended to run on railroads, specified and claimed by the Plaintiff in his declaration, patent and specification, was known and used with the consent and approbation of the Plaintiff before the date of his said patent or his application therefor, by the Hudson and Mohawk Railroad Company, and by the Saratoga and Schenectady Railroad Company, the former at Albany and the latter at Schenectady, in the State of New York; by the Morris Canal Company, in the State of New Jersey; by the Newcastle and Frenchtown Turnpike, and said Road Company in the States of Maryland and Delaware; by the Baltimore and Ohio Railroad Company, by the Baltimore and Washington Railroad Company, a branch of the Baltimore and Ohio Railroad Company; by the Baltimore and Susquehannah Railroad Company; by the Baltimore and York Railroad Company, in the State of Maryland; by the Wilmington Railroad Company, in the State of Delaware; and by the South Carolina Canal and Railroad Company, in the State of South Carolina.

And also that each and every of said Companies, their officers, and servants and agents, had a knowledge of said alleged improvements before the discovery or invention of the Plaintiff, and before the application of the said Plaintiff for his said patent; and used the same on their several and respective canals and railroads, to wit:—the said Morris Canal Company, at Morrisville, in the State of New Jersey; the said Hudson and Mohawk Railroad Company at Albany, and between Albany and Schenectady; the said Saratoga and Schenectady Railroad Company, between Schenectady and Saratoga Springs; the Newcastle and Frenchtown Turnpike and Railroad Company at Newcastle and Frenchtown and between those places; the Baltimore and Ohio Railroad Company; the Baltimore and Susquehannah Railroad Company; the Baltimore and York Railroad Company, at and between the above places; the Wilmington Railroad Company, at Wilmington; and the South Carolina Canal and Railroad Company, on their Canal and Railroad in that State; and also that the said Companies, their officers, servants and agents, knew and used said alleged improvements at their known and accustomed places of running their cars and doing their business; and also that the aforementioned Canal and Railroad Companies respectively used said invention at the several places aforesaid and on their canals and railroads, between the termini of their several canals and railroads, before Plaintiff's discovery and application for his patent.

And you will also take notice, that, on the trial aforesaid, the Defendant will further give in evidence, that one Ephraim Morris, of New Jersey, prior to the said alleged invention, invented and discovered an improvement in the construction of wheels for carriages, to wit: on the 13th day of October, 1829, in all material and substantial parts like the

one claimed by said Plaintiff as his invention and discovery, and obtained, among other things, a patent therefor, bearing date the day and your (?) last aforesaid.

And you will also take notice, that the Defendant will prove that the following persons had a knowledge of, and used said Plaintiff's pretended improvement, prior to his pretended invention and discovery, to wit: Ephraim Morris, on the Morris Canal, in the State of New Jersey; Asa Whitney, Matthew H. Baldwin and James B. Jones, at the city of Albany; James Stimson and John C. A. Smith, at Philadelphia; M. Rogers, engine builder at Patterson, New Jersey; James B. Dorsey, Isaac Knight, Robert S. Hollins, J. Canduce Gatch, Reuben Aler and Jacob Rupp, at Baltimore, while performing mechanical labor for the said Ohio and Baltimore Railroad Company, on the said railroad; by Isaac R. Trimble and Richard Finlay, at Philadelphia or Baltimore, or at one or both of those places.

And you will also take notice, that the Defendants will also prove that the said alleged discovery and invention of the said Plaintiff, and the material and substantial parts thereof, had been discovered by Thomas Tredgold, in a printed publication printed and published in the city of New York, in the year 1825, by E. Bliss and E. White, and that a description thereof had been given in the Railroad Journal, also in a book printed and published in the United States prior to said alleged invention and discovery of said improvement, to wit, in vol. 1, for August, 1832, and for March, 1832; in vol. 2 of the same work for November, 1833; in a work on railroads by Mr. Wood, printed and published in 1825, and also in a work by Mr. Squazine, Civil Engineer, on Railroad Carriages, printed and published in 1828, and also the Report of the Committee of the South Carolina Central Railroad Company, published in the Railroad Journal, 2d vol. for 1833.

And you will also take notice, that the Defendant on trial will also give in evidence, that the description in the specification of the said Plaintiff does not contain the whole truth relative to the aforesaid invention and discovery; and that it contains more than is necessary to produce the desired effect; and that it does not contain such information and direction as to enable those acquainted with the sciences with which it is most nearly connected, to construct such improvement in cars and carriages; and also that the said alleged improvement had been described in printed publications in England and the United States, anterior to the supposed discovery thereof by the Plaintiff; and also that the same improvement had been in public use and on sale, with the consent and allowance of the said Plaintiff; before his application for a patent; and that the said Plaintiff is not the first and original inventor or discoverer of the said thing patented, &c. Yours, &c.,

ROBERT CHRISTIE, JUN., *Def'ts Attorney.*

TO H. HARRIS, Esq. *Plaintiff's Attorney.*

CIRCUIT COURT OF UNITED STATES.

FOR THE NORTHERN DISTRICT OF NEW YORK.

THE SCHENECTADY AND TROY RAILROAD COMPANY, *ads.* ROSS WINANS.

Sir:—In addition to the notice heretofore given, further notice is hereby given under the plea of the general issue, pursuant to the provisions in the act of Congress, that on the trial of the above entitled suit, the Defendants will prove and give in evidence, that the alleged improvement in the construction of cars or carriages intended to run on railroads, specified and claimed by the Plaintiff in his declaration, patent and specification, were known to the following persons, in addition to the persons mentioned in the former notice, previously to the pretended invention and discovery thereof by the Plaintiff, and previous to his application for his said patent, viz: Thomas Robinson and Lucian M. Chase, of Newcastle, in the State of Delaware, and John C. A. Smith of Baltimore; and that the said persons used the said improvements, or some of them and at some one or more of the places, and on one or more of the railroads mentioned in the former notice, served on the Plaintiff's Attorney in this cause. Yours, &c.,

ROBERT CHRISTIE, JR., *Def'ts Attorney.*To H. HARRIS, Esq., *Attorney for Plaintiff.*

CIRCUIT COURT OF THE UNITED STATES.

FOR THE NORTHERN DISTRICT OF NEW YORK.

THE SCHENECTADY AND TROY RAILROAD COMPANY *adsm.* ROSS WINANS.*Further Notice, Special Matter.*To HAMILTON HARRIS, Esq., *Plaintiff's Attorney.*

Please further to take notice that on the trial of the above entitled cause, the Defendants will give in evidence, pursuant to the act of Congress, passed July 4th, 1836, entitled, "An act to promote the progress of useful arts, and to repeal all acts, or parts of acts, heretofore made for the purpose;" that John B. Jervis, now or late of the city of New York, Civil Engineer, Asa Whitney, of the city of Philadelphia, E. P. Williams, of the city of Auburn, William C. Young, now or late of the city of Schenectady, and John Wilkinson, of the city of Syracuse, previously to the pretended invention by the Plaintiff, of the improvements described in his specification set forth in the declaration in this cause, and before he applied for his patent in said declaration mentioned, had, and each of the before named persons had knowledge of the things claimed by said Plaintiff, in his said patent and specification, as his improvements and invention, or of material and substantial parts thereof, at the city of Albany, the city of Schenectady, and other places mentioned in the former notice, and had, and each of them had used the same, or seen the same used on the Mohawk and Hudson Railroad, also on the Saratoga and Schenectady Railroad, also on the Utica and Schenectady Railroad, at the termination of these respective roads, and along the lines of said railroads, or upon one or more of said Railroads, and also upon the several other railroads, mentioned in the former notices in this cause, or some of them.

Also take notice that James B. Dorsey, formerly of Newcastle, in the State of Delaware, and now or lately in the employ of the Baltimore and Ohio Railroad at or near Baltimore; Robert S. Hollins, Camden Gates, Reuben Aler, Jacob Ruff, (?) Isaac Knight, of Baltimore, in the State of Maryland, and Richard Imlay, of the city of New York, previously to the Plaintiff's pretended invention, and before his application for his said patent, had and each of them had, knowledge of the things claimed by the said Plaintiff as his invention and improvement, or of material and substantial parts thereof, at Baltimore, in the State of Maryland, and at the other places mentioned in the former notice, and had each of them used the same, or seen the same in use before the Plaintiff's pretended invention thereof, and before his application for his said patent, upon the Baltimore and Ohio Railroad, the Baltimore and Washington Railroad, the Newcastle and Frenchtown Railroad, and the several railroads mentioned in the notice heretofore given in this cause.

Also take notice that Ephraim Morris, formerly of New Jersey, and now supposed to be a resident of the city of New York, the person mentioned in a notice heretofore given in this cause previous to the Plaintiff's pretended invention, and before his application for his said patent, had knowledge of the things claimed and patented by the said Plaintiff as his invention and improvements, or of some substantial and material parts thereof, and used the same, or saw the same in use on the Morris Canal, in the State of New Jersey; and on the several railroads, or some of them, mentioned in the notice heretofore given.

Yours, &c., ROBERT CHRISTIE, JR.,
Attorney for Defendants.

CIRCUIT COURT OF THE UNITED STATES,

FOR THE NORTHERN DISTRICT OF NEW YORK.

THE SCHENECTADY AND TROY RAILROAD COMPANY *adsm.* ROSS WINANS.

To HAMILTON HARRIS, ESQ., *Attorney for Plaintiff.*

Please to take notice, that in addition to the special matters of which notice has been heretofore given, the Defendants will, on the trial of this cause, give in evidence and prove that the things patented by the Plaintiff, previously to his supposed invention or discovery thereof, and before he applied for his said patent in the declaration mentioned, were in public use on the Mohawk and Hudson Railroad, in the counties of Albany and Schenectady, and on the Saratoga and Schenectady Railroad, in the counties of Saratoga and Schenectady; that bearing carriages or trucks constructed on the same principle and embracing the supposed improvement and invention for which the said letters patent were granted to the said Ross Winans, was, previously to the year 1834, and before the said Ross Winans applied for his said patent, in public use on the Mohawk and Hudson Railroad, under certain locomotives called the John Bull and the Experiment, and on the Saratoga and Schenectady Railroad, under the locomotives called the David or Davy Crockett; and such public use was known to the following persons, among others, to wit: Asa Whitney, now of the city of Philadelphia, John B. Jervis, of the city of New York, William C. Young, now

or late of the city of Schenectady, E. P. Williams, of the city of Auburn, and John Wilkinson, of the city of Syracuse.

Also please further to take notice, that the Defendant will give in evidence, that the supposed improvements and inventions claimed in said letters patent granted to the said Ross Winans, were, long previously to his supposed invention and discovery thereof, and before he applied for his said patent, described in the following public works, namely: in the Repository of Arts, Manufactures and Agriculture, vol. 24th, second series, published in London in the year 1814, pages 129 to 139. Also, in a public work entitled a Practical Treatise on Railroads and Carriages, by Thomas Tredgold, published in the city of New York, in the year 1825, chapter fifth of said Treatise. Also in a public work, entitled, "A practical Treatise on Railroads, and Interior Communications in General, by Nicholas Wood, published in London in the year 1825, pages 154 to 157, and plates therein referred to.

Yours, &c., DAVID BUEL, JR.,
Attorney for Defendants.

And thereupon the process thereof is continued between the parties aforesaid, of the plea aforesaid, in this same Court, before the Judges thereof, until the first Tuesday after the third Monday in June, of the term of June, 1850; and the said issue above joined, is ordered by the said Court to be tried at the Circuit Court, appointed to be held at the Court House in the village of Canandaigua, in and for the Northern District of New York, on the said 18th day of June, 1850.

At which time and place last above mentioned, before Hon. Alfred Conkling, District Judge of the Northern District of New York, and one of the Judges of said Court, came, as well the above named Plaintiff, as the above named Defendant, by their respective Attornies above mentioned, and the jurors of the Jury summoned to try the said issue, being called, also came; who, to speak the truth of the matters aforesaid, being chosen, tried and sworn, say, upon their oath, that the said Defendants are guilty of the premises above laid to their charge in manner and form as the said Plaintiff hath above complained against them. And they assess the damages of the said Plaintiff, by reason of the premises, over and above his costs and charges by him, about his suit in this behalf expended, to one hundred dollars, and for the cost and charges to six cents.

And hereupon the said Plaintiff suggests that the said Defendants made and served a case, and gave notice of motion for a new trial thereupon.

And hereupon the process thereof is continued between the parties aforesaid, of the plea aforesaid, in this same Court, before the Judges thereof, until the first Tuesday after the third Monday in June, of the term of June, 1851.

And now, at this day, to wit, the 3d day of September, 1851, all and singular, the premises being seen and by the Court here fully understood, and mature deliberation being thereupon had, it appears to the said Court that the verdict aforesaid, of the jurors aforesaid, in form aforesaid given, is in all respects, good and valid in law, anything to the contrary thereof in anywise notwithstanding. Therefore it is considered that the said Plaintiff do recover against the said Defend-

ants, his said damages, costs and charges, by the jurors aforesaid, in form aforesaid assessed, and also six hundred and sixty-one dollars and twenty-two cents for his said costs and charges by the said Court now here adjudged, of increase to the said Plaintiff and with his assent; which said damages, costs and charges, in the whole, amount to seven hundred and sixty-one dollars and twenty-eight cents.

And the said Defendants in mercy, &c.

Judgment signed this 13th day of October, 1851.

A. A. BOYCE, *Clerk.*

Filed Oct. 13th, 1851.

UNITED STATES OF AMERICA, NORTHERN DISTRICT OF NEW YORK, ss.

I, Augustus A. Boyce, Clerk of the Circuit Court of the United States of America for the Northern District of New York, in the Second Circuit, do hereby certify that the preceding is a true copy of a Judgment Record on file in this office.

In testimony whereof, I have hereunto subscribed my name and affixed the seal of the said Court, at Utica, this 20th day of October, eighteen hundred and fifty-one, and of the Independence of these United States the seventy-sixth.

AUG. A. BOYCE.

Fees \$7,44; paid by C. D. Gould, Esq., for Ross Winans.

A. A. BOYCE, *Clerk.*

UNITED STATES OF AMERICA, NORTHERN DISTRICT OF NEW YORK, ss.

I, Nathan K. Hall, one of the Judges of the Circuit Court of the United States for the Northern District of New York, do hereby certify that I am well acquainted with the hand-writing of Augustus A. Boyce, whose name is subscribed to the above certificate, and that the signature to the same is in his proper handwriting. And I do further certify that he was, at the time of signing the same, Clerk of the Circuit Court of the United States of America for the Northern District of New York

Dated Dec. 8, 1853.

N. K. HALL.

Circuit Court U. S., Massachusetts District. Filed in the Clerk's Office, Jan. 17, 1854.

Attest :

H. W. FULLER, *Clerk.*

CASE.

CIRCUIT COURT OF THE UNITED STATES,

FOR THE NORTHERN DISTRICT OF NEW YORK.

THE SCHENECTADY AND TROY RAILROAD COMPANY, *adversus* ROSS WINANS.

This is an action for the infringement of a patent granted to the Plaintiff on the 1st of October, 1834, for an improvement in the construction of cars or carriages intended to run on railroads. The suit was commenced on the 14th July, 1847.

Either party may refer to the pleadings and notices on the argument.

The action was tried at the term of the Circuit Court of the United States, at the court house in Canandaigua, which commenced on the 18th day of June, 1850, before the Hon. Alfred Conkling, District Judge of the Northern District of New York, and one of the judges of said Court, and before a jury of the county of Canandaigua.

The Plaintiff gave the following evidence to support the issue on his part, viz: A patent for a new and useful improvement in the construction of cars or carriages intended to run on railroads, dated 1st October, 1834, being the same set forth in the declaration. The patent was recorded anew the 7th of June, 1837, as appeared by a memorandum to that effect endorsed on said patent. No drawings were attached to it, nor was there any reference in the patent to any drawings. A copy of the patent and specification, and of said memorandum of their record anew, is annexed to this case marked Exhibit, No. 1, on the 25th September, 1848. The patent was extended for seven years from the 1st October, 1848, as appeared by a certificate of extension endorsed on said patent, of which certificate a copy is set forth in said Exhibit, No. 1.

The Plaintiff then offered in evidence a certified copy from the Patent Office of said patent, said specification and said certificate of extension, and of a certain drawing, and of certain written references to said drawing, and of an affidavit made by the Plaintiff, November 19, 1838. The said copy of said patent, specification, and certificate of extension, was in the same words as is set forth in said Exhibit, No. 1. The said certificate from the Patent Office, and the said copy thereto annexed of said drawing, said written references and said affidavit, were in the words and figures as set forth in Exhibit, No. 2, hereto annexed.

The drawing was not filed at the time the patent was recorded anew, but was filed on the 19th November, 1838.

The Defendant's counsel objected to the evidence offered, because

first, it appeared that no drawing was annexed to the original patent; *second*, that the act of Congress does not make such a drawing as this evidence. The judge overruled the objection and admitted the evidence, to which the Defendant's counsel excepted.

The following Depositions, taken on the part of the Plaintiff, were then read in evidence:

DEPOSITION OF PHILIP E. THOMAS.

WINANS vs. THE TROY AND SCHENECTADY RAILROAD COMPANY.

PHILIP E. THOMAS, a witness on the part of the Plaintiff:

1. Are you acquainted with Ross Winans, the Plaintiff in the above cause? and, if yea, how long have you known him?

To the first interrogatory he answers: That he is acquainted with the said Ross Winans, the Plaintiff in said cause, and has known him since very nearly the commencement of the Baltimore and Ohio Railroad.

2. Were you any time President of the Baltimore and Ohio Railroad Company? and was Ross Winans in the service of said Company, and what were his duties and the terms of his employment?

To the second interrogatory he answers: That he was the President of the said Railroad Company from the organization thereof, in the year 1827, until the year 1836; that said Ross Winans was in the service of the said Baltimore and Ohio Railroad Company during the period this affirmant was President, and his duties were the improvement and perfection of the machinery proper to be put on the railroad, for which he received, as witness believes, a salary of \$1500 a year. The Company were to have the benefit of any discoveries or inventions he might make without charge, he having the benefit of the Company's shops, their road to make experiments and try the machinery on, and the use of the Company's materials. There was a period when his salary ceased, but he cannot now recollect the period, or whether it was when witness was President, or subsequently, when witness was a Director.

3. Under whose supervision and upon whose plan, if you recollect, was the eight-wheel car put upon the Baltimore and Ohio Railroad?

To the third interrogatory he answers: That the first eight-wheel car was put upon the road during the time said Ross Winans was in the employment of the said Company, and it was under his supervision, as affirmant recollects and believes. It is a very difficult question for affirmant to answer, on whose plan the said car was put on the road, but affirmant's impression is, that it was upon the suggestion of said Winans.

4. If you recollect the name of the first eight-wheel car put on the said railroad, please to mention it, and, if in your power, describe the construction.

To the fourth interrogatory he answers: That he believes the first eight-wheel railroad car put on said railroad was called the Columbus. As far as affirmant knows, there had been no eight-wheel car used at that time. The Company had no plan upon which to con-

struct them, and therefore, in order to ascertain what would be a suitable and convenient plan, they constructed cars on several plans as regarded their arrangement for the accommodation of passengers, and affirmant does not precisely recollect on which plan the Columbus was constructed. Affirmant refers in the above answer to the bodies of the cars.

1. Additional interrogatory.

To what were your duties as President of the said Company especially directed? Did they extend to the supervision of the Department of Machinery, or was that confided to others, and if so, to whom was it confided?

JNO. B. LATROBE, *for Pl'ff.*

To the additional interrogatory by Plaintiff he answers: That the details of the business of the Company were divided into departments. The business of the company was complicated, and ramified itself into many different branches. Affirmant's duty was to preside at the meetings of the Board of Directors; to receive the reports monthly and submit them to the Board; to attend to the general financial affairs of the Company, and conduct the correspondence; and to have a general superintendence of its concerns. To the best of his recollection, George Gillingham was the Superintendent of Machinery.

(Signed,)

P. E. THOMAS.

Cross-Interrogatories to be propounded to Philip E. Thomas, a witness on the part of the Plaintiff.

1. Can you state more precisely the duties and office of the Plaintiff, Ross Winans, during his connection with the Baltimore and Ohio Railroad Company during your Presidency, than you have already stated?

To the cross-interrogatories by the Defendant, he answers: To the first cross-interrogatory he answers, that the Plaintiff had no other duties but what he has stated, that he knows of.

2. Did Mr. Winans' appointment give him the control and management of the machine shops, during that period of time? or was there not a Superintendent of Machinery of said road?

To the second cross-interrogatory, he answers: That upon the organization of the said Company, the duties of the service were divided into several departments. There was a Board of Engineers, whose duty it was to plan and locate the road. There was a Superintendent of Construction, whose duty it was to lay the timbers on the road and make it. There was a Superintendent of Masonry, whose duty it was to build the stone bridges. There was a Superintendent of Machinery, but affirmant does not distinctly recollect whether the Plaintiff was that Superintendent or not.

3. In your answer to the third interrogatory in chief, do you refer to an eight-wheel passenger car, or to all eight-wheel cars for any or all purposes?

To the third cross-interrogatory he answers: That his impression is, that the first eight-wheel car put on the road, was a passenger car, and that after that, the Company went on to put other eight-wheel cars on the road.

4. Can you state from recollection, whether the wheels and run-

ning gear of the first eight-wheel passenger car was of Winans' construction and plan, and that no other person or persons connected with the Company made suggestions in regard to such plan or construction?

To the fourth cross-interrogatory he answers: That he cannot answer this question, for he does not know who Winans may have conferred with, or who may have made suggestions to him, or whether he conferred with or received suggestions from any one.

5. When you state that your impression is, that the plan of the body of the eight-wheel passenger car, called Columbus, was made upon the suggestion of Winans, what is the full extent of your information on that subject?

To the fifth cross-interrogatory he answers: That he is not aware that he has made such a statement, as that the plan of the body of the eight-wheel car was made on the plan of Winans.

6. When you speak of the suggestion of Winans, in connection with placing an eight-wheel passenger car on the road, do you mean to say that the plan of construction of the body, or the running gear was that of Winans', or that an eight-wheel passenger car was put on the road at his suggestion?

To the sixth cross-interrogatory he answers: That he means to say, that in speaking of the eight-wheel cars, he refers to the running machinery. As to the body, a carpenter could do that. He refers to the running gear.

7. Was there any running gear composed of eight wheels used for transportation of timber or other articles on said road, before the construction of the Columbus?

To the seventh cross-interrogatory he answers: That none was used that he is aware of.

8. How often did you see Winans engaged in the construction of an eight-wheel passenger car, or superintending its construction?

To the eighth cross-interrogatory he answers: That he has no recollection that he ever saw him; affirmant had other duties to perform which prevented him from looking into Winans' manipulations.

9. Was it a part of your duty, as President of the said Railroad Company, to examine the plans of construction of the cars intended for the use of said Company?

To the ninth cross-interrogatory he answers: That it was not his duty as President to do so.

10. Have you a sufficient acquaintance with the construction of railroad cars, as of the running gear and bodies, to designate differences of construction in various kinds of eight-wheel passenger cars?

To the tenth cross-interrogatory he answers that he has not.

11. Will you please state, if you remember, whether a certain Conduce Gatch was in the service of said Company and in what capacity?

To the eleventh cross-interrogatory he answers: That he has no recollection of said Conduce Gatch at all.

12. Do you remember ever to have seen a plan of construction of the running gear or body of an eight-wheel passenger car exhibited to you?

To the twelfth cross-interrogatory he answers: That he does not recollect to have seen a plan of the construction of the running gear and body of an eight-wheel passenger car exhibited to him.

13. Where did you see the Columbus? and who was the Manager or Superintendant of the building, (if any,) where it was exhibited?

To the thirteenth cross interrogatory he answers: That he saw the Columbus on the road, and rode in it.

(Signed,)

P. E. THOMAS.

DEPOSITION OF GEORGE BROWN.

WINANS vs. SCHENECTADY AND TROY RAILROAD COMPANY.

Interrogatories by Plaintiff to George Brown.

1. State whether you know the Plaintiff in this cause, and if yea, how long have you known him?

To the first interrogatory he answers: That he knows Ross Winans, the Plaintiff, and has known him from the year 1828.

2. Was the Plaintiff ever in the service of the Baltimore and Ohio Railroad Company, and, if yea, when, and in what capacity?

To the second interrogatory he answers: That he thinks the Plaintiff was in the employment of said Baltimore and Ohio Railroad Company, and to assist Mr. Knight in matters of machinery. Mr. Knight was Chief Engineer. He cannot fix the date; thinks it was in 1829 or 1830, on Winans' return from England.

3. Do you know anything in regard to the introduction of the eight-wheel car into use on the said railroad? and whether the said Plaintiff had anything to do therewith. State all that you recollect on the subject, and what opportunities you had of knowing any thing about it.

To the third interrogatory he answers: That with regard to the date, he cannot speak; but one thing he distinctly recollects, that he was the Treasurer of the Company about that time, and that Evan Thomas, Ross Winans and himself, were talking over machinery, and whether it was suggested by Deponent, by Mr. Winans or Mr. Thomas, he cannot say, but it was suggested by some one of them, how much safer an eight-wheel car would be for passengers over the four-wheel car, and Mr. Winans then went on to make a drawing of such an eight-wheel car as he supposed would answer the purpose.

4. Look at the drawing marked "Oliver Cromwell, No. 1," and say whether you ever saw it before, to the best of your recollection, and when, and whether it represents the car Columbus as you remember it.

To the fourth interrogatory he answers: That the drawing marked "Oliver Cromwell, No. 1," represents the car Columbus which witness superintended the building of, or saw building every day after Winans made the drawing. Deponent got the Board of Directors to have a car made after the drawing, as an experiment.

Cross-Interrogatories to George Brown, a witness sworn and examined on the part of the Plaintiff.

1. What was the particular office which Winans held in the em-

ployment of the Railroad Company? and state if you have positive knowledge of his particular duties appertaining to the same.

To the first cross-interrogatory he answers: That when Mr. Winans first came, he brought a plan of friction wheels; but when he came into the Company's employment, or in what particular capacity, he cannot say. He was looked upon as inventing and improving machinery that was put on the road.

2. Do you mean to say that Mr. Winans was the inventor of any or all the machinery placed upon the road, and will you specify any invention of his that was placed upon said road?

To the second cross-interrogatory he answers: That Winans certainly was the inventor of machinery put on the road. He was employed to perfect the cars in their running gear.

3. Had he the exclusive control of any machinery put upon the road, to your positive knowledge?

To the third cross-interrogatory, he answers: That he does not know that Winans had the exclusive control of machinery put on the road. Deponent's impression is, that he suggested his improvements to Jonathan Knight.

4. Did you ever hear Mr. Winans claim to be the inventor of an eight-wheel passenger car of any description, and when the car Columbus was put on the road, have you any distinct recollection that the car was said to be the invention of Ross Winans? State particularly all you know.

To the fourth cross-interrogatory, he answers: That after the drawing was completed, Deponent never heard of any person mentioned as being the inventor of the eight-wheel car, except Mr. Winans, with the suggestions which Mr. Evan Thomas, Deponent, and Deponent's father, may have communicated to him in conversation. What Deponent communicated to him was this: that the eight-wheel car would be safer than the four-wheel car, and this led to their making a little drawing of the manner in which they supposed it could be arranged, in a rude way. The first suggestion to Deponent's mind, were two long beams of wood in which the wheels were to work singly—a plan which was not adopted.

5. Where and when had you seen an eight-wheel car which induced you to make any suggestions?

To the fifth cross-interrogatory he answers: That at that time, he had never seen an eight-wheel car in his life. The idea was suggested to Deponent by the circumstance that it would be safer, and that if a wheel broke, there would be less danger.

(Signed,)

G. BROWN.

DEPOSITION OF JOHN ELGAR.

WINANS vs. TROY AND SCHENECTADY RAILROAD COMPANY.

Interrogatories to be propounded to John Elgar, a witness on the part of the Plaintiff in the above cause.

1. Are you acquainted with the said Ross Winans, the Plaintiff in this cause, and how long have you known him? State whether he was

ever in the service of the Baltimore and Ohio Railroad Company, and if yea, in what capacity?

To the first interrogatory, he answers: That he is acquainted with the Plaintiff, Ross Winans, and first became acquainted with him in 1830, and understood that the said Winans in the summer of 1830, was in the employment of the Baltimore and Ohio Railroad Company, as Assistant Engineer of Machinery.

2. Are you acquainted with the eight-wheel passenger and burden cars in use on railroads? and if yea, when did you first see them in use, and under what circumstances? and what was your profession, occupation and employment at that time, and what now?

To the second interrogatory, he answers: That he is acquainted with the eight-wheel passenger and burden cars in use on railroads, and first saw an eight-wheel passenger car, he thinks, in 1831. It was a car called the Columbus, on the Baltimore and Ohio Railroad. He was employed on the said railroad at the time, as Assistant Engineer of Machinery, and his occupation now is that of a Civil Engineer.

3. To the best of your knowledge and belief, who was the first and original inventor of the eight-wheeled car, as a part of the machinery for the transportation of passengers and burdens upon said railroad? and if you name an individual in answer to this interrogatory, please to state all your knowledge and means of knowledge, grounds (facts) of belief, and attendant circumstances.

To the third interrogatory, he answers: That Ross Winans was the first and original inventor of the eight-wheel car now in use, as part of the machinery for the transportation of passengers and merchandise on railroads. Affirmant's employment was part of the time out at the Mount Clare Depot, superintending the construction of cars. And early in the spring of 1830, there was occasion to haul long timber on part of the railroad already laid, for the purpose of laying on embankments. To transport it on a railroad, it required to be loaded on two little platform cars of four wheels each, as on one car it would have swagged too much. To enable these four-wheel cars, one being placed under each end of the load, to pursue the curvatures in the road, they found it necessary to place a bolster on each of these cars, upon which the timber was loaded. These bolsters were suggested by affirmant, and put on the cars under his direction. And what first led to the suggestion of bolsters was, that the timber laid on the floor of each four-wheeled car restrained the cars from readily pursuing the curvatures of the road. These cars were afterwards coupled together with a piece of board, to transport timbers of shorter length—rail way timbers. These two four-wheel cars for hauling shorter timber, varying in length from twenty to forty feet, were coupled together with a long strip of board, by having a hole in each end, which dropped upon the draw-pin of the hindward and forward car. Having charge of the shops, affirmant was applied to by a Mr. Wentz, who had charge of hauling long ark(?) timber, to devise some mode of loading that timber, so that it should not occasion the cars to run off the track, which he found frequently occurring. Affirmant proposed at once to obviate the difficulty by the use of a bolster on the centre of each car. Wentz approved of the idea, and affirmant directed Conduce Gatch, who was chief carpenter at those shops, to have two bolsters made as soon as he could. This

was done in three or four hours probably, a load of timber put on them, and they answered the purpose intended, no more difficulty occurring. This occurred, he thinks, in the month of April, 1830; he knows it was in 1830, and he thinks in the month of April. At this time affirmant was very much engaged in procuring chilled wheels for the Company, and carried the idea of an eight-wheeled car no farther than this temporary contrivance. About the first of June following, Ross Winans returned from England and came to Baltimore, and, he believes, entered into the service of the Company, and was the chief of his time out at the depot of the Company at Mount Clare. Some short time after this, he, or some one, he cannot distinctly now recollect, showed affirmant a drawing, but he thinks it was a young man by the name of Cromwell, who was building or repairing the passenger cars. This drawing, to the best of his recollection, exhibited an eight-wheel passenger car, body and trucks together; and affirmant understood from general fame, that Ross Winans was the originator of this drawing; affirmant does not recollect that he had any particular conversation with Ross Winans on the subject then. Sometime in the year following, to the best of his recollection, a car which he thinks corresponded to the drawing, was put on the railway, and this car was called the Columbus; he thinks so. Affirmant rode in it once to Ellicott's Mills that summer, the summer of 1831. In 1832, affirmant left Baltimore and was engaged on the Columbia railroad, Pennsylvania, but was some time in Baltimore in that year, and in 1833 and in 1834, but not a resident; and during some of these years, perhaps during 1834, he noticed some other eight-wheel cars at the outer depot at Mt. Clare, one with the body suspended near the railroad track between the trucks, and he thinks it was called the Dromedary. About the time of the opening of the Washington branch road, the year he does not recollect, he noticed the present construction of cars used on that road, that is, he noticed that the cars put on that road were such as are now used, and he is aware that Ross Winans had the direction of the construction of those Washington cars.

4. Please to state what eight-wheel cars were made and used on the said railroad after the Columbus, up to the building of the Washington cars, and as far as you can recollect them. Please to describe the same, and wherein they varied from the car Columbus, and whether or not they were used on the said railroad, and whether their use continued, or whether they were abandoned? Look at the drawing marked "Oliver Cromwell," which is said to be a representation of the car Columbus.

To the fourth interrogatory he answers: That on recollection he thinks there was another eight-wheel car called the Winchester, composed of several common coach boxes set on a frame, at least it had that appearance; the car was constructed after that appearance. These are all the eight-wheel cars he recollects up to the opening of the Washington railroad. The coach boxes of the Winchester were on a level frame. The principal distinctive features in these three cars were between the two others and the Dromedary. The distinctive features were in the position of the running gear, and they consisted in placing the trucks in the Dromedary he thinks rather beyond each end of the body, so that the body swagged between them, whereas, in the other two, the trucks

were placed some small distance inward from each end. Not being a resident here, he could only give an impression, and this impression is, that said cars were not often used.

5. Now say whether you have read the specification of Plaintiff's patent, and if yea, state whether the car Columbus, supposing it to be truly represented on said drawing, corresponds with the car described in said specification, and if not, in what does the difference consist? and whether the said car Columbus fulfils the requisition of the said specification? and, if you say there are differences, please to state whether they are important?

To the fifth interrogatory he answers: That he has looked at the drawing marked "Oliver Cromwell, No. 1," and attached to the deposition of Oliver Cromwell, and has read the specification of the Plaintiff's patent. He does not consider the car Columbus, supposing it to be truly represented on said drawing, fulfils the requisition of said specification. He thinks the specification calls for the axles and wheels of each truck to be placed as near to each other as may be to work freely, and that each truck should be separated from the other under the body of the car as far apart as the strength of materials and convenience will admit; and on this drawing the wheels of each truck are farther apart than is called for in the specification, and the two trucks are placed nearer together, or farther from the ends of the body than is called for by the specification. He thinks the differences he has stated are important. He cannot say that the drawing now shown him is the one shown him by Oliver Cromwell, but said drawing is a fair representation of the eight-wheel car Columbus, as he now recollects it.

6. State whether the construction of an eight-wheel car involves a careful arrangement and adjustment of parts and proportions in reference to its use, or whether these are matters of comparative indifference.

To the sixth interrogatory he answers: That he thinks that a proper adjustment of the several parts is important, and if a careful adjustment is not attended to, injury will be suffered or benefits lost.

7. Please to state whether or not the specification of the Plaintiff's patent herewith shown, contains a full description of the principle and mode of operation of the eight-wheel cars now employed upon the railroads of the United States, so far as your knowledge of such employment extends, and contains all matters requisite for the construction and use thereof.

To the seventh interrogatory he answers that he thinks so.

8. Please to state whether, in your opinion, the occasional use for the transportation of long timber of two common dirt cars, with platforms and bolsters connected by a perch of length corresponding to the length of the timber, and used to prevent the cars from being drawn apart and from under the load, the motive power being attached to the body of the car and not to the timber, constituted an eight-wheel car such as is described in the specification aforesaid; and, if not, wherein is the difference to be found?

To the eighth interrogatory he answers: That he thinks it does not constitute an eight-wheel car as described in the specification aforesaid. The difference that strikes him is: that one is a combined permanent machine and the other a temporary vehicle. They differ again in this: that the axles and wheels of the platform car used as a truck in the

lumber car are placed farther apart than the specification calls for, because these platform cars are often used separately for common purposes. They would not answer so well for a single load as if placed as close together as the specification calls for; and they differ again in this: that in the lumber car the motive power was attached to the running gear, which may put a constraint on the free action of the running gear. In the other case, in the eight-wheel car, the motive power is attached to the body, and this leaves the trucks free to pursue the curvatures of the road.

WINANS vs. THE TROY AND SCHENECTADY RAILROAD COMPANY.

Cross-Interrogatories to be propounded to John Elgar, a witness sworn on the part of the Plaintiff.

X 1. In answer to the 1st interrogatory you say you understood that Mr. Winans was employed as an Assistant Engineer of Machinery in 1830, by the Baltimore and Ohio Railroad Company; can you say positively that he was so employed, and why you have that impression?

To the cross-interrogatories he answers:

To the first cross-interrogatory he answers: That he cannot state it positively, but he understood from Winans, that soon after his return, he was taken into the Company's employ within a month, or two or three months; he thinks he understood this from Winans. He cannot be positive about Winans being an Assistant Engineer at that time, but affirmant is positive that he was an Assistant Engineer in 1831. He heard Winans say so in 1831 or the spring of 1832, and he heard the Chief Engineer, Jonathan Knight, say that Mr. Winans was his Assistant Engineer of Machinery. Affirmant was at that time Assistant Engineer of Machinery, and when Winans first came there, he thinks Winans was assisting affirmant, and both of them assisting the Chief Engineer, and shortly before he went to Pennsylvania he heard Jonathan Knight say that Winans was principal Assistant Engineer of Machinery.

X 2. When did you first see the application of the bolster and swivel principle applied to the transportation of timber with eight-wheels?

To the 2d cross-interrogatory he answers: That he never saw the use of bolsters upon a railway till he suggested it to Gatch; he has seen it applied on common roads.

X 3. When you say that Ross Winans was the inventor of the eight-wheel car, do you mean the eight-wheel passenger car or all eight-wheel cars, for any and all purposes?

To the 3d cross-interrogatory as to what eight-wheel cars were the invention of Winans, he answers: That he means the eight-wheel passenger and burthen cars as they are now used.

X 4. Is there any similarity in the principle as applied to the transportation of timber, as contained in your instruction to Gatch, and that of the eight-wheel passenger car now in use? and if there is any difference, state in what it consists.

To the fourth interrogatory, he answers: That the only close similarity that he sees, is in the use of the bolster, which is used in both. The differences between them are such as he has stated in answer to the eighth interrogatory in chief.

X 5. In transportation of timber on eight-wheels, as you have de-

scribed, was the distance of the wheels apart a matter of observation and regulation dependant upon the length of the timber?

To the 5th cross-interrogatory he answers: That in the timber car the distance of the trucks apart depended on the length of the timber.

X 6. After you suggested the use of the bolster, did it ever occur to you that the same principle might be applied to passenger cars, and did you ever express that view?

To the 6th cross-interrogatory, he answers: That he has no recollection that the use of it, as applied to passenger cars, ever occurred to him, and he does not think it did occur to him.

X 7. At the time you made the suggestion to Conduce Gatch, to have the bolsters made for the transportation of timber, had you any suggestions made to you by Ross Winans?

To the 7th cross-interrogatory he answers: No. Ross Winans was not in the country at that time. It would be more proper for him to say that he had never seen Ross Winans at the time he made the suggestion to Gatch.

X 8. How often did you see the drawing which you say was shown you by Cromwell, of the car Columbus? and do you know that the running gear of the Columbus was built after that drawing?

To the 8th cross-interrogatory he answers: That he does not recollect to have looked at said drawing more than once; he may have done so. He does not know that the running gear of the Columbus was built after that drawing.

X 9. When did you first hear that Ross Winans claimed to be the inventor of the eight-wheel passenger car, or how did you obtain that impression?

To the 9th cross-interrogatory he answers: That to the best of his recollection, it was about the time the Columbus was built, that he first heard Ross Winans claim to be the inventor of the eight-wheel car; he does not recollect any particulars. It was only from a general impression, from his having this drawing made and the car built, that it was the general conversation about the shops that Winans was the inventor. His strong impression is, that Ross Winans did claim to be inventor of a combined machine, by placing a body on bolsters to carry passengers and merchandize.

X 10. Did he claim the eight-wheel car, as used with bolsters, as his?

To the 10th cross-interrogatory, he answers: That he only understood him to claim them as a combination in the combined machine, as a part of the combination of the combined machine.

X 11. When you say that the location of the wheels was at the ends of the timber, did you not know that the timber might be placed upon the wheels and transported with the wheels brought closer together?

To the 11th cross-interrogatory he answers: That he certainly might have known, if he had thought of it, that the wheels might have been varied in their distances; but he never thought of it.

X 12. Was not the advantage of placing the trucks near together, to prevent the swagging of the timber, thought of by you, as well as the action of the bolster to adapt to the wheels to the curves?

To the 12th cross-interrogatory, he answers: No, not thought of by him when he started the thing, that is, when the bolsters were put on

the cars. Affirmant went away on other business, and paid no further attention to it at that time, but the next day the wagoner reported to him that it answered the purpose completely.

X 13. Do you know whether, in the practical use of the bolster principle, the trucks were brought together by the workmen engaged in such transportation?

To the 13th cross-interrogatory he answers: That he does not know, except only in the case of hauling short timber, the trucks were brought proportionably nearer together.

X 14. Is there anything stated in the specification of the patent of Ross Winans, which you think important to produce the benefits claimed for his invention, and which he claims as new and important? was it not known to you before the reading of the specification, and also independent of the information you derived from seeing the car Columbus or any other car built under the direction, as you suppose, of Ross Winans? and if so, state what they are.

To the 14th cross-interrogatory he answers: That he thinks that although all the principles, separately, may have been known in theory to himself and others, that Winans claims in his specification, neither himself nor any other person, had ever combined them into a whole, so that they should mutually act to produce the benefits and advantages that do result from the car described in, and built from, the principles contained in his specification.

X 15. Do you mean, when you say that these principles were never combined together in eight-wheel passenger cars before Ross Winans' invention, that these combinations are mentioned by him as claimed, to be new? and do you believe that the combination expressly claimed by him is necessary to produce the results?

To the 15th cross-interrogatory he answers: That he understands Winans' claim, to be a claim of a new combination of principles of action, which may have been heretofore known. He does consider the combination described by the said Winans necessary to produce the full results claimed in his specification.

X 16. What do you understand to be the combination claimed as something new?

To the 16th cross-interrogatory he answers: That Winans combines the bolster principle with the trucks, and connects them with a permanent body; and he further combines the advantage of bringing the axles of each truck near together, which will not answer advantageously in a four-wheel car, and which had not been done before, and the extending the two trucks as far apart as strength of materials and convenience will permit; and he also combines with these that of attaching the motive power to the body, instead of the running gear.

X 17. If the weight is distributed properly in the eight-wheel passenger car, as is stated by Winans, was known to be important before his application, and was obtained by other eight-wheel passenger cars, is there anything else stated by him to be observed in his combination necessary to produce the results sought for?

To the 17th cross-interrogatory he answers: That besides the equal distribution of the weight, Winans claims the close proximity of the two axles in the two trucks, the wide separation of the two trucks, and the advantage of the motive power being hitched to the body, instead of the running gear.

(Signed,)

JOHN ELGAR.

The Defendant's counsel objected to the eighth direct interrogatory and Elgar's answer thereto, on the ground that the interrogatory and answer assumed without proof that he was an expert, but the Court overruled the objection, and the Defendant's counsel excepted.

DEPOSITION OF JONATHAN KNIGHT.

IN THE CIRCUIT COURT OF THE UNITED STATES FOR THE NORTHERN DISTRICT
OF NEW YORK.

ROSS WINANS vs. THE TROY AND SCHENECTADY RAILROAD COMPANY.

June Term, 1850.

JONATHAN KNIGHT, a resident of East Bethlehem township, in the County of Washington, in the State and Western District of Pennsylvania, being produced as a witness on behalf of the Plaintiff in this case, at the town of Washington, in said County, and examined *de bene esse*, by and before William K. Vankirk, a Judge of the Court of Common Pleas in and for said County, and being carefully cautioned and affirmed to tell the truth, the whole truth and nothing but the truth, deposeth, in answer to the interrogatories exhibited to him, on behalf of said Plaintiff, as follows:

1st Int. What is your name and profession, and how long have you been so engaged, and on what works of internal improvement have you been engaged as Engineer?

Ans. My name is Jonathan Knight. I am engaged in Agriculture in Washington County, Pennsylvania. I was Chief Engineer of the Baltimore and Ohio Railroad Company from the commencement of the year 1830 till the 31st of March 1842. My profession was then, and previously, Civil Engineering. In 1828 I visited England, in the service of said Company, to obtain railroad information, and returned to Baltimore in 1829.

2d Int. Do you know the Plaintiff in this suit? If yea, when and where did you become acquainted with him?

Ans. I am well acquainted with Ross Winans, the Plaintiff in this suit. I first met with him in Liverpool, England, about the first of the year 1829, whither he had gone in the matter of his friction car, and where I was then, as stated in my previous answer.

3d Int. Were you Chief Engineer of the Railroad constructed by the Baltimore and Ohio Railroad Company during the years 1831 to 1836, both inclusive?

Ans. I was Chief Engineer for the Baltimore and Ohio Railroad Company, as stated in my answer to the 1st interrogatory.

4th Int. Was the Plaintiff, during any portion of that time, in the service of the Baltimore and Ohio Railroad Company? If yea, state when, to the best of your knowledge, his engagement commenced, and what were his duties in the service of said Company.

Ans. The Plaintiff returned from England to Baltimore, Maryland, in the year 1830; and by authority from the Board of President and Directors of said Company, as Chief Engineer, I appointed said Ross Winans to be my assistant in the department of machinery of said Company. This appointment was made in the year 1831, and I believe took date from the first of that year.

5th Int. Do you know of the introduction on the Baltimore and Ohio Railroad, of the first eight-wheel car? If yea, state under whose direction and from whose plans it was constructed.

Ans. The first eight-wheel car was placed on the Baltimore and Ohio Railroad under my direction, in the year 1831 or 1832, according to my best recollection.

6th Int. State the name of the first eight-wheel car placed on said road, and the proportion of its parts in construction; that is, how near were the flanges of the wheels to each other on each side of each bearing carriage, and how near were the bearing trucks to each other in proportion to the whole length of the body of the car?

Ans. The first eight-wheel car was planned by Plaintiff, then my assistant, and I believe it was called the "Columbus." It was a passenger car. The body rested upon two cross beams or bolsters, each of which was supported by a carriage or truck, of four wheels and two axles. The wheels on the side of each truck were as close to each other as their flanges would well permit of. The car body being some 20 to 30 feet long, the bearing trucks were intended to be placed as far asunder as the length of the car would permit, consistent with strength. The trucks were under the ends of the car body.

7th Int. Were the proportions of this first car, adopted for subsequent cars, constructed for said road?

8th Int. How many and what other, by name eight-wheel cars, were constructed for said road prior to the building of the eight-wheel cars intended for the Washington branch of said road? Will you state the order in which these cars were constructed, and the variations made in each of them, as near as you know and as fully as you recollect?

Ans. to 7th and 8th Ints. This first car being imperfect, others were built by way of improvement, under the immediate direction of the Plaintiff, one of which cars was called the "Dromedary." These improvements were, in this manner, conducted and perfected in the fore part of the year 1834, when the eight-wheel passenger car, so invented and perfected by my said assistant, the Plaintiff, was fully adopted by the said Company, on my recommendation, and was accordingly constructed for use upon the Washington Railroad, to be opened in the next year, 1835.

I do not recollect the names of all the experimental eight-wheel cars, nor the precise changes or modifications of one from another, but which were all once known to me. According to my best recollection, they consisted in the relative external and internal forms and finish of the bodies and in the proper proportions for strength and a successful operation in practice of the principles involved in the eight-wheel car.

9th Int. Will you state in what particulars the "Washington Cars" varied in their proportions and arrangement of parts from the first eight-wheel car above referred to?

Ans. For answers to this I refer to my answer to the 7th and 8th interrogatories.

10th Int. Please state in detail whether the construction of an eight-wheel passenger car involves a careful arrangement and adjustment of parts and proportions with reference to its use, or whether these are matters of comparative indifference.

Ans. In the truck supporting each end of the eight-wheel car, the two axles may be placed as near to each other as is compatible with a free revolution of the two wheels on each side of said truck, so that the said two wheels shall not at any time come in contact with each other. Then the truck of four wheels will be so compact, or occupy so little of the road, lengthwise of the same, that the said truck will traverse the curves of the road almost with the like ease and freedom from resistance and wear, as would a single axle and its two wheels. Two such trucks being placed under a car body, in such a manner as to turn at a centre freely, will therefore traverse the road approximately as easy as only one of them; while the car itself may be of any convenient length, say to accommodate 40, 50 or 60, or even more passengers. The trucks must be placed so as to give stability and relative strength to the car body resting upon them; an arrangement that like all the others, had to be attained in the experiments already mentioned in my answers to preceding interrogatories.

11th Int. Has the eight-wheel car as at present used, any advantages over the four-wheel cars made for the same purpose of transporting passengers and merchandise? If yea, state these advantages.

Ans. The eight-wheel car thus perfected, and at present used generally upon railroads in the conveyance of passengers, has decided advantages over the car of four wheels, as being more capacious and pleasant, and easier warmed in winter, safer and subject to less wear and tear and fewer accidents. Hence its adoption has become general. In the year 1834, I had no hesitation in recommending its adoption by the Baltimore and Ohio Railroad Company for the conveyance of passengers, but it was not clear to me then, that the car of eight wheels similarly arranged, should be preferred for the freight business. Subsequently, however, the advantages of that sort of car have, I believe, proved such as generally to supersede the four-wheel car, except in the regular transit of coal.

12th Int. Have you read the specifications of the letters patent issued to the Plaintiff, Ross Winans, Oct. 1, 1834, for an improvement in the construction of cars intended for use on railroads? If yea, state whether or not the specification contains a full description of the principle and mode of operation of the eight-wheel car now used on the railroads of the United States, so far as your knowledge extends, and whether it contains all the suggestions requisite for the construction thereof.

Ans. I have read the specification of the letters patent, issued to Ross Winans, the Plaintiff, of Oct. 1, 1834, for an improvement in cars for railroads, and so far as my knowledge extends, I believe the specification contains a full description of the principle and mode of operation of the eight-wheel car now used on the railroads in the United States, and contains all the suggestions requisite for the construction of such cars.

J. KNIGHT.

DEPOSITION OF JOHN H. B. LATROBE.

ROSS WINANS vs. THE TROY AND SCHENECTADY RAILROAD COMPANY.

Interrogatories to John H. B. Latrobe, a witness on the part of the Plaintiff.

1. Do you know the Plaintiff in this cause, and how long have you known him?

To the first interrogatory he answers: That he knows the Plaintiff in this cause, and has known him since his return from Europe, in 1830.

2. Did you know the car Columbus, spoken of by the witness in this cause, as having been used on the Baltimore and Ohio Railroad, and at what time?

To the second interrogatory he answers: That he recollects the car Columbus well, and rode in it in the summer of 1831.

3. Do you recollect the cars with eight wheels which were subsequently put on the said road up to the opening of the Washington road? and if yea, describe them to the best of your recollection.

To the third interrogatory he answers: That he recollects distinctly three cars of eight wheels, built after the Columbus, and put on the railroad in 1834. The first was named the "Winchester," which was composed of three carriage bodies, built with swelled sides after the fashion of common coaches, and resting on a framing which in its turn rested on two trucks, which, as near as witness recollects, were under the centre of the outer bodies. The next car was called the "Comet," and consisted of five small carriage bodies, the three inner ones being suspended between the trucks, and the two outer ones being immediately over the trucks. These bodies rested on a platform composed of two side pieces, plated with iron, and curved so as to permit the inner bodies to hang between; the trucks were composed of four wheels each, and the bolster, instead of resting upon an ordinary frame, rested upon strong springs that connected the axles as they rested upon the outside journals. The wheels of the trucks were brought as close together as they could be, leaving room for the lower bolster to rest on the springs between them. The trucks were under the centres of the outer bodies. This car was subsequently altered, but the date is not recollected by witness, so as to put all the bodies on the same line. Witness appends hereto a rough diagram marked "J. H. B. L., No. 1," to explain his testimony more fully as regards the form and construction of the cars above mentioned.

The last car was the "Dromedary," which witness believes to be represented on the drawing marked "J. H. B. L., No. 2," with the exception that the spaces over the trucks were closed up so as to make a sort of box or car-body. Deponent does not recollect when these cars were commenced; he speaks of the order only in which they appeared on the road; he believes they were all being built at the same time.

The next eight-wheel passenger cars which witness recollects, were the cars on the Washington Railroad. Witness was, at the time here spoken of the counsel of the Baltimore and Ohio Railroad Company, taking, in common with many others connected with said Company, a

deep interest in all that related to its practical operation; and having a turn for matters relating to machinery, he was led, therefore, to pay constant visits to the workshops of the Company, and added his own suggestions to those which every body around the Company was giving. He can say with truth that he watched the building of the bodies of the Winchester and Comet from the commencement of their framing, and believes that the suggestion of the five bodies of the Comet was in part his own. Witness makes this explanation to account for one of his profession having knowledge on such a subject, and being able to speak of it with confidence after such a lapse of time.

Cross-interrogatories to be propounded to J. H. B. Latrobe, a witness on the part of the Plaintiff.

X 1. Did you prepare the paper, a copy of which has been exhibited in this case, as the specification of Winans' patent?

To the first cross-interrogatory he answers: 'That said specification was originally prepared by Ross Winans, and submitted to the late Dr. Thomas P. Jones and witness to be perfected.

X 2. Do you consider the car Columbus, as shown by the drawing now exhibited to you, as a sufficient representation of all that is important in principle in the specification of Winans' patent?

To the second cross-interrogatory he answers: Very far from it.

X 3. Have you any knowledge, derived from your connection with the Baltimore and Ohio Railroad Company, to state why it was that, after the Columbus was built and used, the same plan was not afterwards adopted, and why the varieties of cars named by you were made as experiments?

To the third cross-interrogatory he answers: That the car Columbus, while it succeeded in certain or some respects, was looked upon, as witness believes, as not sufficiently satisfactory to authorize adopting it as a precedent. It was used as an excursion car to Ellicott Mills principally, and was, although at what periods witness cannot say, altered. Prior to the opening of the Washington road, the character of the car to be adopted for use thereon, became a matter of importance and frequent discussion among those interested in the operations of the Railroad Company, and witness believes that the three cars mentioned by him in his examination in chief, were built with a view to the perfection of the eight-wheel car by experimenting upon different modifications of it. Witness would here state that the interest which he took in the subject of cars, was so well understood, that he was called on one occasion before the Board of Directors to meet Mr. Winans, and to discuss a point connected with the construction of the Washington cars, and on which Mr. Winans and himself had differed in opinion.

X 4. When you rode in the car Columbus on her experimental trip in 1831, was Ross Winans one of the party?

To the fourth cross-interrogatory he answers: That it is utterly impossible for him to mention one individual in the company; whatever might be his inference, his memory does not enable him to speak positively.

X 5. Did you hear at that time Ross Winans claim to be the in-

ventor of the car Columbus, or did you, from any knowledge you then possessed, ascribe to him the car Columbus as his invention?

To the fifth cross-interrogatory he answers: That from the commencement of his knowledge of the eight-wheel car, he has believed Ross Winans to be the inventor, as well of the car Columbus as of the car described in the specification of his patent; and this is founded as well upon the declaration of said Winans as upon the understanding of all the parties with whom witness associated in his relations with the Railroad Company, and whom he heard speak on the subject.

X 6. You will please answer the last interrogatory, as to the knowledge you then possessed. Did you, at that time, ascribe to him the invention?

To the sixth cross-interrogatory he answers: That he recollects distinctly having seen the car Columbus on her first trip, and having then looked upon it as the invention of Ross Winans.

X 7. Did you hear from him at that time that he claimed it to be his invention, and when do you recollect the first conversation on the subject?

To the seventh cross-interrogatory he answers: That he cannot, at this time, identify a single conversation which he had with Ross Winans by a reference to time, place or circumstances, up to the preparation of the specification of his patent, although he has no doubt that such conversations were of frequent occurrence. Deponent has no doubt that he heard from Winans that he claimed it; the Deponent cannot identify the time, place or circumstance. Deponent saw him constantly. Deponent, reviewing what has just been written, does recall an occasion, the date of which he fixes by the burning of the Athenæum, when Ross Winans showed him a drawing of the Washington car as subsequently built or then being built, (Deponent cannot say which,) and spoke of it as his invention. This was in the office of Deponent, in the Mechanics' Bank building, to which Deponent moved temporarily when his office in the Athenæum was burnt. The Athenæum was burnt on the 7th day of February, 1835.

Deponent desires to state that the room in the Mechanics' Bank occupied by him as an office, was, before he went into it, on the burning of the Athenæum, occupied by the Baltimore and Ohio Railroad Company, and it is possible that the interview with Mr. Winans, of which he speaks, may have taken place while it was so occupied. He is in doubt as to this fact, being positive only as to the fact of the conversation, the drawing which was shown to him, and the place where the conversation took place. This is the only conversation which he can particularly identify, as having been held with Mr. Winans, in reference to the invention of the eight-wheel car, *except* those connected with the preparation of his specification.

X 8. What was the period of time which elapsed after the building of the Columbus, and the preparation of Winans' specification?

To the eighth cross-interrogatory he answers: That all he can say in answer to this question is, that the preparation of the specification occupied much time, and he was consulted about it a long time before the patent was taken out, but how long he cannot say; whether six months or a year he cannot say. He only remembers that the specification was a long time on hand.

X 9. When you were consulted about the specification of Winans'

patent, had you any knowledge of the drawing exhibited in this case, marked Oliver Cromwell, No. 1?

To the ninth cross-interrogatory he answers: That he had no knowledge of said drawing, and knew nothing of it until it was produced by Oliver Cromwell, on the trial of the case of "Winans vs. the Newcastle and Frenchtown Railroad Company."

X 10. Did you not frequently see Mr. Winans on other subjects except the matter of the specification, in your capacity of counsel for the Railroad Company as well as his private counsel?

To the tenth cross-interrogatory he answers: That his intercourse with Winans, from the beginning of his acquaintance with him, has been frequent upon various subjects, professional and other.

(Signed,)

JOHN H. B. LATROBE.

DEPOSITION OF BENJAMIN H. LATROBE.

WINANS vs. TROY AND SCHENECTADY RAILROAD COMPANY.

Interrogatories to Benjamin H. Latrobe, a witness on the part of the Plaintiff.

1. Do you know the Plaintiff in this cause, and how long have you known him?

To the first interrogatory he answers: That he knows the Plaintiff, and has known him since 1830.

2. Look at the drawing now shown you marked "J. H. B. L., No. 1," and say, if you know, who made it, when it was made, and what it represents? If you say you made it, state what was your occupation at the time, and what is your present employment. State the minimum curves on the Baltimore and Ohio Railroad, if you know the same.

To the second interrogatory he answers: That he has looked at the drawing marked B. H. L., No. 1, annexed to this deposition. Witness made this drawing in 1831, and it represents a car for the transportation of flour on the Baltimore and Ohio Railroad. There were other four-wheel cars on said road having different kinds of journal boxes, but resembling the car shown on said drawing in other particulars; and with the said variation in the form of the journal boxes, it was the ordinary form of the car in use on said road at that time for the transportation of flour and other commodities. At the time he made said drawing he was an Assistant Engineer in the employment of the said Railroad Company, chiefly employed in occupations connected with the location of the road. His present employment is that of Chief Engineer of the said Baltimore and Ohio Railroad Company. The minimum curves on said road were four hundred feet radius, which occurred frequently.

(Signed,)

B. H. LATROBE.

DEPOSITION OF JOHN H. ALEXANDER.

WINANS vs. THE TROY AND SCHENECTADY RAILROAD COMPANY.

The deposition of John H. Alexander, a witness on the part of Plaintiff, taken 11th Oct. 1849, before John Carrere, a Commissioner, ap-

pointed by the Circuit Court, was then read in evidence, and which is as follows :

JOHN H. ALEXANDER being sworn, says that he is a Civil Engineer by profession, and is thirty-six years of age ; that in 1831 and 1832 he was an Assistant Engineer in the service of the Baltimore and Susquehannah Railroad Company, of which, in 1832, he was the Resident Engineer ; that, in July of that year, the locomotive called the Herald was imported from England for the use of the road. It had two driving wheels from which the power was connected with the forward wheels, all the wheels being of the same size, and, as he recollects, either four and a half or five feet in diameter, or thereabout. When it was placed on the road in August or September of the same year, it was found that it would not pass the curves, which were numerous, without a tendency to run off the track. On communicating this fact to George W. Whistler, the Engineer in charge, he desired Deponent to consult with and take the advice of Ross Winans in regard to such changes as were requisite to fit the engine for use on the road. Witness accordingly called on the said Winans, as he well recollects, and the whole subject was fully discussed between them. This was in the afternoon, and, on the following morning, Mr. Winans called on Deponent with a sketch exhibiting the substitution of a four-wheeled truck with wheels of thirty inches as near as he recollects, in place of the forward wheels of the engine. The truck was subsequently constructed, placed under the engine, and was found to answer the purpose. Witness with his own hands draws here a sketch, which he believes to represent accurately the original sketch furnished by said Winans. Witness is able to do this, because within eighteen months he found the said original sketch among his papers and recognized it at once, which said sketch is either lost or mislaid, so that he cannot put his hands thereon.

This sketch, rough as it appears, conveyed to Deponent's mind the idea of the truck in place of the forward wheels of the engine, and the truck was subsequently constructed from it, as before stated.

(Signed,)

JNO. H. ALEXANDER.

11th October, 1849.

DEPOSITION OF OLIVER CROMWELL.

The Plaintiff's counsel then called as a witness on the stand,

OLIVER CROMWELL, who testified as follows : I reside in Baltimore ; am a coach-maker ; have worked at that business since 1824. I have worked on railroad car bodies in the employ of the Baltimore and Ohio Railroad Company, and of other companies ; commenced working for the Baltimore and Ohio Railroad Company in 1830 as a journeyman ; Conduce Gatch was foreman of the shop ; I have known Plaintiff since 1830. When I first knew him, he was engaged about the depot giving directions respecting the work,—about the cars principally. The part of the railroad which was first opened, was from Baltimore to Ellicott's Mills, about fifteen miles ; that was before I came there to work. Ellicott's Mills are about five or six miles west of the Washington branch. The Washington branch road was opened in 1835.

In 1831, I first had knowledge of an eight-wheel car. The first information I had of it was from George Brown, who said Winans was getting up a drawing; this was early in the spring of 1831. There was a drawing brought out. (A drawing being shown to the witness, he says): that is the drawing which Winans brought to me to work from. I have not the slightest doubt it is the same—the drawing represents the body and running gear. I think it was in March, 1831. I had not before seen or heard of an eight-wheel car. I immediately commenced working on the body at the Mount Clare depot, where the Company had a shop. I worked about three months on that body. Mr. Conduce Gatch had charge of the shops at the depot. He was foreman of the shops. There were two wood workshops and one blacksmith shop; the shops were three or four feet apart near the track of the railroad. The trucks were made in the shop adjoining that in which I worked. The trucks were made sometime while the body was making; it took longer to make the body than the trucks.

Rupp and Michael Glenn were the men employed in building the trucks in Gatch's shop. Francis Gatch worked next me on the car body. Winans was about there and occasionally gave directions about making the body. I think he took his idea of the running gear from this drawing. The drawing was in the shop where I was working, and Gatch would naturally look at it; he was often in the shop.

Gatch was foreman of all the shops, the wood work and blacksmith shops. I know of his taking the dimensions of the running gear from the drawing. He had a drawing board in his shop, and my impression is, he made the draft on his board from the drawing, and went to work and made the trucks. The scale of the drawing was three quarters of an inch to the foot. [The drawing was marked Oliver Cromwell, No. 1.] This drawing became soiled by being nailed over a stove hole two or three years after I left the employ of the Company. I left the Company in 1832. I had the drawing in my possession for seven years. I put it up over the stove hole.

That car (the Columbus) was first put upon the road in 1831. There was a disposition to have it on the road before the 4th of July. It made an excursion on that day with other cars to Ellicott's Mills. I saw the Columbus move from the depot; she had a few days before made a trial trip to the Relay House, about nine miles. The running gear of the Columbus was built pretty much as represented in the drawing. It had friction boxes like the model shown to me.

[The Plaintiff's counsel then offered to ask the witness in what manner the car was attached to the motive power (or) to the following car in the train, to which Defendant's counsel objected, on the ground that the manner of attachment was not described in the specification. The Court overruled the objection, and admitted the evidence, to which the Defendant's counsel excepted.] The witness says the connection between the Columbus and the motive power was by a perch from the truck, as exhibited in the drawing marked O. Cromwell, No. 1. The Columbus occasionally run off the track in turning curves. Some alterations were made in it shortly after it was built; a new bolster was put on, and I think the wheels of the trucks were drawn nearer together. I cannot state how long the friction boxes were used. I think but a short time;

different forms of friction boxes were used. I left the employ of the Baltimore and Ohio Company in October, 1831; returned in June, 1832; then continued until October, 1834.

The next eight-wheel car built was the Winchester. She was put on the road in 1833. The Columbus did not appear to give satisfaction. No cars gave satisfaction until the Washington cars were built. The Winchester had three separate bodies placed on a frame. My impression is, that she was connected to the motive power by the frame on which the bodies rested. The Winchester was used generally and was considered a pretty good car. I cannot state at what season of the year she was put on the road; it was some considerable time before the fall of 1834, when the plan of the Washington cars was adopted.

The Dromedary was the next car built; it was suspended at the ends, having four apartments in one frame. In the Winchester, the three bodies were separate. The Dromedary was put on the road in 1834, before I left in October, but did not answer a good purpose. My impression is, she was connected to the motive power by the trucks. I do not recollect of any other car being built while I was there; my recollection is not distinct about the Comet; I was not in the employ of the Company when the Washington cars were built. I have seen them on the road; they had long bodies, the entrance at the ends with a platform, connected to the motive power from the body of the car; they had two trucks under them; there was an under framework on which the bodies rested. The bolsters were of iron, and I think they had a spring over each journal. These cars, I understood, were planned by Winans.

Oliver Cromwell, on *cross-examination*, testified as follows: I saw Conduce Gatch take a measurement from the drawing which I have spoken of. I saw him measure the drawing of the trucks to make a truck by. There was no scale shown on the drawing. I was told by Mr. Winans what the scale was.

The measuring of the drawing would give the length of the truck. I think Mr. Winans gave instructions about these drawings, besides what is contained in that drawing marked Oliver Cromwell, No. 1. I cannot say positively that Mr. Winans gave any instructions as to the construction of the trucks; if he did, it was to Mr. Gatch. I don't know that I heard him give any instructions to Mr. Gatch; cannot say whether I did hear him give any instructions or not to Gatch.

I feel perfectly confident the trucks were not completed before I began the body. I commenced working for the Company the latter part of May, 1830; the Plaintiff was not there at that time; Francis Gatch was the only person who worked in the shop with me; Conduce Gatch had the superintendence of all the shops; Winans' employment was outside about the depot and in the shops; he was out there about every day; his office was located at the Company's office in Baltimore, about three quarters of a mile from the shops; Mr. Elgar was about there; he and Mr. Gatch had consultations about the construction of those cars; I don't know that I *heard* Mr. Winans claim the invention of the running gear on the body of the Columbus. Before I began to work on the Columbus, I saw two burthen cars used on the railroad for drawing timber. Bolsters were placed on the platform. I have seen drafts of various trucks on the draft board of Conduce Gatch before and after the

Columbus was built. I first saw the Washington cars when they were building, and I saw them when they were put on the road. Those cars had a frame work resting on the trucks, and the body rested on the frame work, which raised the bodies eighteen or twenty inches above the bolsters; the springs were under the frame.

On *re-examination*, the witness testified as follows: I did not hear any person except Mr. Winans claim the invention. I think the drawing of the Columbus was sufficient to enable a mechanic to construct a truck from. I cannot say whether the drawings of trucks on Gatch's draft board, which I saw before the Columbus was made, were like the trucks of the Columbus or not. I don't know that before I saw the drawings of the Columbus I had seen the drawings of any trucks adapted to a double truck eight-wheel car. The cars built before the Columbus were the common four-wheel cars.

The said Oliver Cromwell, on being again cross-examined, testified as follows: I never worked by a scale before making the car body of the Columbus; coach makers, as a general practice, work from a draft of full size; I was a coach body maker; I never worked on wheels. The flanges on the wheels of the Columbus were on the inside of the rails; I never saw any outside.

DEPOSITION OF MICHAEL M. GLENN.

MICHAEL M. GLENN was called as a witness by the Plaintiff, and testified as follows:

I reside on the eastern shore of Maryland; I was formerly a carpenter; was in the employ of the Baltimore and Ohio Railroad Company from 1829 or 1830 to 1840 or 1841. I was engaged in the shop, doing anything that came along; this was a new thing then; this was the first road I ever heard of in this country. I know Conduce Gatch and Ross Winans; became acquainted with Winans in 1830 or 1831; it was directly after his return from Europe. He was about the shop there engaged on the machinery. He was Civil Engineer under Jonathan Knight. The shop Gatch and I worked in was at the Mount Clare depot; the shop Cromwell worked in was two feet from it; there was an entrance from the one to the other; Gatch's business was to oversee all the shops as foreman, and to see that the men did their work; he worked as the men did. In 1830 or 1831, I first saw a drawing of an eight-wheel car; it was brought to the shop, I believe, by Winans and laid on Cromwell's table. It is the one shown to me, (marked Cromwell No.1); I first saw it on Cromwell's bench; I don't remember having it previously spoken of; the body of Columbus was built in Cromwell's shop. I assisted in building the trucks of Columbus in the shop adjoining Cromwell's. I think the trucks were built while the body was being built, from the drawing. Jacob Rupp and I were the workmen. We considered they were built under Winans' direction. He was about the shop and the depot nearly every day. The trucks were built in the form shown in the drawing; the trucks were connected to the motive power by a perch; the perch was attached to the cross pieces of the truck; there were no springs; friction boxes were used, which gave ease to the motion of the car. The work on the Columbus

commenced in March or April, 1831, and she was brought out in June or July. We did not like the Columbus. I think the difficulty was, she would not traverse the curves as well as they desired. The Columbus was twenty-seven feet long; the cars in use vary a good deal in length. I never knew an eight-wheel car built before the Columbus, after that plan; I had never met with any such truck before that or knew of any. I think I received directions from the Plaintiff while working on the trucks; it was his plan of construction; there was some alterations made in the Columbus, but I forget what. The next eight-wheel car constructed then was the Winchester; I can't recollect when she was constructed; I don't remember how she differed from the Columbus, except that she was hauled by the body and that she had plain boxes. Another car was built called the Dromedary; I don't remember the time; she differed in shape from the others; she was connected to the motive power by the running gear; they did not like her. I think she was connected to the motive power by a perch, like the perch in the Columbus; I don't know what the difficulty with her was. The Comet was built last; I don't know when she was brought out. I think the road adopted Winans' cars in 1834. I was then Superintendent on the road. I cannot say how long this was after the Comet was brought out. I think they did not like any of the four cars before named; they did not work well. I saw the Washington cars when they came on the road; there were at first two, three or four of them; it was 1835; the building of them commenced in 1834; the body of the car was fixed on two bolsters to each truck, one on the top of the other; there was a spring to each box; there was a king-bolt went through each two bolsters; the trucks were free to play; there was a spring playing in sockets in the top of each end of each upper bolster, to give ease to the car; the bolsters were of wrought iron; there has been no material change made in the cars since; this arrangement of the trucks is useful; all the Railroads use this description of cars.

The witness being *cross-examined*, testified as follows:

The first time I saw the drawing, it lay on Cromwell's bench. I did not see it brought there; the Plaintiff gave the directions in relation to making of the trucks; he explained the way they should be made. He explained something about the bolsters; it was an unusual thing to us to fix the bolsters in the way those were fixed. He showed us how to fix the friction boxes; the Columbus was drawn by horses. I don't know by what power the Winchester or Dromedary was drawn, nor the Comet. I don't remember whether any other car was attached to the Columbus when she run to Ellicott's Mills, on the 4th of July, 1831; I had never before saw bolsters fastened on trucks. I have seen two four-wheeled platform burden cars, used for drawing long sticks of timber, a bolster on each end of the platform cars. I saw it before the Columbus was built. I did not have the drawing before me when we worked at the trucks of the Columbus. Conduce Gatch gave us directions, but not more than the Plaintiff. Mr. Gatch directed us to go on and make the trucks. We worked from the drawings on a board. I think Mr. Gatch made that drawing. I am acquainted with operations of railroads. I was Superintendent of the cars of this road under George Gillingham for nine years. I think Winans saw the drawing on Gatch's board; I have no doubt he saw it. I think but one of the four

cars before named was drawn by the body. I think that was the Winchester. My business as Superintendent of the cars was to see that the cars were kept in order. The Washington cars were stronger built and simpler, and considered safer than the Comet, because the running gear had free access to the rail and was less liable to run off, not having any perch to bind them, and vibrating with the curves of the road. I forget whether the Comet had a perch or not. I am not able to say whether I worked on the Comet. I did not on the Washington cars.

On *re-examination* the witness said:

I think Gatch got his drawing on his draft board from the drawing which Cromwell had; I think I saw him bring the drawing into the shop; I was at work on the bench near him within two feet, and saw him draw it, I think, on the bench. What I mean by adopting the cars is, that they were used on the road. Some ten or fourteen cars were made for the Washington road before I left. The last cars made for that road before I left, were constructed in the same manner as the first Washington cars were. I left in 1840 or 1841; locomotive power was brought on the road before I left; no other power was ever used on the Washington branch.

DEPOSITION OF WASHINGTON O. FROST.

WASHINGTON O. FROST, a witness called by the Plaintiff, testified as follows:

I reside in the State of Maine; I resided in Baltimore from boyhood until 1833; I was in the employment of the Baltimore and Ohio Railroad Company; I worked for them in 1829; I was an apprentice to Conduce Gatch, to learn the trade of a millwright; I left the employ of the Road in June, 1833; I became acquainted with Plaintiff in 1829; I never saw an eight-wheel car until 1830 or 1831, when I saw the Columbus; I think another was built in 1832, after the Columbus had made one or two trips; the body of the Columbus was commenced before the running gear. Oliver Cromwell and Francis Gatch worked on the body; the running gear was built in an adjoining shop; one of the trucks was made by Glenn and Rupp; I think I worked on the other truck some; Mr. Conduce Gatch worked some; I saw a drawing of the car; it was furnished by Plaintiff; Mr. Gatch had a drawing of the truck on a board in the shop where I worked; it was not a full drawing, but a sketch; he took it from the drawing of Mr. Winans.

On his *cross-examination* the witness testified as follows:

I saw Plaintiff bring out a drawing; I think he gave it to Mr. Gatch; am certain he did; I have seen the drawing here to-day; had not seen it before since I saw it in the shop; I know it to be the same because it was painted yellow, and from the form of the trucks; I think it was the latter part of 1830, or the fore part of 1831, that Plaintiff brought out the drawing; I was in my 22d year; I think I saw Winans about the shops in 1829; I examined the drawing when Winans brought it out; I think other eight-wheel cars besides the Columbus had been put on the road before I left in 1833; I went from Baltimore to Boston, where I was employed by the Boston and Providence Railroad Company in making cars; I now reside in Hallowell, Maine.

DEPOSITION OF ANDREW S. POND.

ANDREW S. POND, a witness called by the Plaintiff, testified as follows:

I reside in Utica, and am in the machinery and foundry business; have been in that business 41 years; have made steam engines and other machinery of various kinds; have made some parts of work for cars for Eaton & Gilbert, coach makers in Troy, and afterwards I saw some of the articles which I furnished to them on cars on the Schenectady and Troy Railroad. I furnished some bumper irons with spiral springs. Eaton & Gilbert are extensive builders of railroad cars. I think I first saw eight-wheel cars on Defendant's road in 1842. I first went over the road in 1842; they then had the eight-wheel cars; have been on this road I think a dozen times; eight-wheel cars are used on the road. I never saw any but eight-wheel cars on the road; I think the passenger cars will carry forty-eight or fifty passengers; they had two trucks, one under each end or near each end, a spring to each wheel, draught from body of car; under the body of car the trucks are pivoted. I should think the wheels of each truck almost $3\frac{1}{2}$ feet from axle to axle; wheels about thirty inches in diameter; there was room for a brake between the wheels; the cars are like those on other roads in this State and other States. I have travelled extensively on railroads. The cars in Massachusetts, Connecticut, Rhode Island, New Jersey, Pennsylvania, Maryland and to Washington, are similar cars; this truck movement to turn around curves is found in all these cars and in those on Defendant's road. I have read the Plaintiff's specification and seen the drawings. I think I could make a car from them without difficulty. The cars of Defendant's road differ some from the Plaintiff's specification; the bumpers are different. The first eight-wheel car which I ever saw was on the Auburn and Syracuse Railroad, in 1838. It had lattice frame work on the sides of the body, and trucks under; it is still used. I think the long cars were used on Defendant's road before they were on the Utica and Schenectady road. I have not seen four-wheel cars on railroads for a long time.

Being *cross-examined*, the witness testified as follows: I examined Defendant's cars; they had side bearings; they had bolsters fastened to the body and the trucks. I have seen nothing in the specification about side bearings, nor about the manner of attaching the cars to the motive power. The Defendant's cars are attached to the motive power by a cast-iron head, screwed into the centre of the front beam of the car, and they are attached to each other in trains by a link or two links. I find nothing in the Plaintiff's specification respecting the manner of attaching cars together to run in trains. I should think the distance in Defendant's cars of the centre of the trucks from the end, is about one-fourth the entire length of the car, including the platforms. The Plaintiff's specification does not mention the distance at which the trucks should be placed from the end of the car.

The Plaintiff then offered to ask the witness whether the drawing introduced by the Plaintiff shewed any arrangement that performed the office of side bearings. The Defendant's counsel objected that if the drawings represented any thing not mentioned in the specification, such addition could not be claimed as part of Plaintiff's invention.

The Judge decided that the drawing might be referred to, to illustrate the specification, but not to enlarge the claim of the patent, and allowed the Plaintiff's counsel to examine the witness respecting what was represented in the drawing in relation to side bearings, to which the Plaintiff's counsel excepted.

The witness Pond further testified :

In the side view of the drawing, the top and bottom bolsters lie so that any rocking motion would cause them to come together. I think on examining the drawings, that there would be a bearing but not a full bearing between the upper and lower bolster, in the rocking of the cars. I find in the end view of the drawing, a representation that the body and not the truck is to be coupled to the next car.

On being afterwards *cross-examined*, the said Pond testified as follows :

There would be a bearing of a little more than sixteen inches each side of the king-bolt. The upper surfaces of the lower bolsters are not raised at the ends in the drawing.

Question by the Court :

After all your examination, do you still find in the drawing a mode of preventing the excessive rocking of the cars?

Answer. I do.

The Plaintiff then rested.

The Defendants then gave the following testimony :

DEPOSITION OF SAMUEL WOOD.

SAMUEL WOOD, called by the Defendants, testified as follows :

I reside in Watervilet ; am in the employ of Defendants as a carpenter and joiner, and have been so a little over two years ; I am acquainted with the cars on Defendants' railroad. In the year 1847 there were four passenger cars and twenty freight cars ; they are all there now ; all of them have side bearings, some wheels and some slides ; I have measured the cars ; the freight cars are twenty-eight feet long ; the average distance between the king-bolts is nineteen feet five inches ; this distance varies in different cars ; the distance between the tread of the wheels in some of the cars is fifteen inches, in others twenty-one inches ; the bodies of the passenger cars are thirty-two feet long ; the distance between the king-bolts is twenty-four feet ; the distance between the tread of the wheels is fifteen inches ; the diameter of the wheels in all the cars is thirty-three inches ; in the locomotives the distance between the tread of the wheels in some is but three inches, in others a foot.

On his *cross-examination*, the witness testified as follows :

The motive power is applied to the body of the cars ; the trucks have free play under the bodies.

The Defendants then gave in evidence a patent to Ephraim Morris, dated 13th October, 1829, for a new and useful improvement for raising and lowering boats from one level to another on canals, the specification of which is as follows : (See Exhibit, No. 2.)

DEPOSITION OF EPHRAIM MORRIS.

EPHRAIM MORRIS, called as a witness for the Defendants, testified as follows :

The drawing now shown, [and which is to be produced on the argument,] represents my car ; the elevation of the lock plane was one to twelve ; the summit plane one to ten ; part of it one to twelve ; the elevation from top to bottom was one to forty-eight. The road over which my cars run had no lateral curves, but only vertical. At the lock plane the chain was hitched to the body of the car ; at the other planes the car was moved by a force applied to the body of the car ; the swivel moved to accommodate the passing of the wheels over the vertical curves ; there were iron rails like those of common railroads ; the first railroad was a flat rail, the next an edge rail ; the eight wheels divided the weight and prevented crushing the rail ; the object of the swiveling was to enable the wheels to pass on to another inclined plane having a different inclination ; the length of my car was fifty feet ; the centre of the trucks was twelve feet from the end of the car ; on some of the planes the wheels were three feet in diameter, others four feet ; the tread of the four feet wheels were nine inches apart ; the tread of the smaller sized wheels were further apart ; I believe two feet three inches. The Plaintiff's trucks are the same as mine, except that the frame of mine had two beams, one each side of the wheels, the Plaintiff's had but one. In applying for my patent I did not think I had a right to claim the bolsters, because it was old and in common use. I had no idea of turning lateral curves with my car. My occupation is building and superintending the putting up of different kinds of machinery ; I have always been engaged in that business ; begun in 1827 ; am a practical mechanic ; have been engaged in putting down turn tables ; assisted in putting up the machinery at Harlem High Bridge ; have superintended the putting up of steam engines and other machines.

In order to make my cars traverse lateral curves, it would only be necessary to put a piece of iron under the bolster, take out the four horizontal bolts and drill a hole through the bolster and insert a king bolt on the principle of a bolster of the fore-wheels of a common wagon, except the cars have side bearings ; the necessity of side bearings depends upon the size of the centre bearings.

On being shown the drawings introduced by Plaintiff of his specification, the witness says :

No side bearings are represented in Plaintiff's drawing, except on each side of the king bolt ; the upper and under bolsters appear to touch for the space of about sixteen inches each side of the king bolt.

The witness being *cross-examined*, testified as follows :

My trucks are bolted to the body of the carriage ; they have no play except in a vertical direction ; there is no mention in my patent of connecting those trucks with the carriage by two bolsters and a king bolt ; there is no means described in my patent for swivelling in a lateral direction ; I do not in my specification describe my car as a railroad car ; I do not think that there is any more need of providing for variation from a straight line on railroads, than for variations from a horizontal plane ; I saw eight-wheel cars used on railroads before my patent

expired ; I never made any claim for remuneration from the railroad companies ; I don't recollect whether I first saw a railroad before or after I took out my patent ; it was about that time I first saw a railroad at Hoboken ; it was about sixty yards long ; the track was two feet wide ; I never saw a railroad car with four bearings for each axle ; Winans' truck has a play for the lower bolster, mine has not ; I should not as an Engineer, construct a railroad axle with four bearings.

DEPOSITION OF CONDUCE GATCH.

(Deposition referred to by John Carrere, page 374.)

CONDUCE GATCH, for Defendant, deposes and says as follows :

I am fifty years of age ; I reside in the city of Baltimore, and have been in the employment of the Baltimore and Ohio Railroad Company. I think it was early in 1831 that I went into the employment of said Company, and I think I left them in May or June, 1834, the employment of said Company. I was employed to superintend the building of cars, and making patterns. I am a millwright by trade. After the Baltimore and Ohio Railroad had progressed as far as Ellicotts' Mills, we found great difficulty in carrying long timber for the purpose of constructing the road, and sometimes in loading hogsheads of sugar and other articles they rolled to the end of the car and tilted the end down ; the wheels were set from four to five feet apart at that time, on four-wheel cars from the centres of the axles, and from this difficulty the idea of an eight-wheel car was first suggested to my mind. In order to obviate then the difficulty, I had a plate of iron placed on a truck or stone car, exactly in the centre, and on that I placed a bolster with a corresponding plate of iron on the under side of the bolster ; an iron pin passed through the bolster to hold the bolster to its place. I placed two of these cars, with bolsters corresponding, at any suitable distance to carry lumber ; which lumber was from twenty-five to thirty feet long ; the axles were about two feet ten inches apart. This was the first construction. There were two principal objects in view : one was, to remove the difficulty in loading long lumber on a short car, and the other was, that we found that wheels placed four or five feet apart, passed through the switches and curves a great deal harder than when the wheels were placed close together ; there was more friction and consequently more jarring, and it was harder on the car. I do not know that we used after this invention any cars with the wheels four or five feet apart, that is any eight-wheel cars where two trucks were used. The wheels after this invention were placed as close together as they could conveniently be. The only principle involved in my invention, was the enabling of the truck or the frame work and the four-wheels to pass round under the load at any angle almost, and to adapt itself to the curve ; one truck could be turned at right angles with the other, each truck being placed at any distance apart. I took the idea from the bolster of a common wagon first. Actual experience on the road showed me the advantage

of having the wheels close together. The placing of the wheels close together was not an accidental discovery, nor was it discovered from the want of knowledge of the effect produced by it. This invention, at the time of its being first used or invented by me, was regarded as an important invention on the said road, and was always considered by the hands who worked on the road as my invention. In the first passenger car that was made on this principle, the running gears or trucks were made by my drawings under my directions, and I ordered and obtained all the materials necessary, at the expense however of the Company, (the Baltimore and Ohio Railroad Company.) I am little at a loss about the date, but I think this was in 1832, and I am pretty certain it was in 1832. After this, two or three other passenger cars were made on the same principle by my direction and from my drawings, and all of them were made previous to October the first, 1834, the date of Mr. Winan's patent.

I considered that precisely the same advantages would be obtained in adopting and using this invention on passenger cars, as I have detailed was obtained in its use on burthen cars. The evil I have mentioned, in placing timber or hogsheads on the car, was a difficulty which occurred in loading the cars. In making the passenger cars, the sole object I had in view was to carry out the principle which I have before stated; that is to say, to enable the cars or trucks to pass through curves and switches easier and with less friction.

I have frequently examined the eight-wheel passenger cars which are run upon the Baltimore and Susquehannah Railroad, the Baltimore and Philadelphia Railroad, and the Baltimore and Ohio Railroad, and I have seen no difference of principle in these cars from the principle discovered and used by myself, as herein before stated. I have been eye-witness to some sixty or seventy burthen cars (eight-wheels) built recently by Mr. Dennread of this city, and the principle is precisely the same.

I have heard read and know the contents of the specification marked S. P., and in my invention the danger from oscillation and swinging from side to side was obviated, and the cars were enabled to pass through the curves and switches at any speed without this oscillation, and this would prevent the liability to breakage and tend to the safety of the passenger cars. My invention prevents oscillation at all times, as well on a straight line of the road as on the curves. The principle of my invention, and the principle set forth in the specification S P, I consider as the same, that is, all that is material to accomplish the objects. The fact is, I consider that there is no invention about it, except the principle involved in enabling the truck or running gears of the car to pass with ease through short curves or switches under a heavy load or burthen, and I believe that the eight-wheel car is adapted to any road, straight or curved.

Q. You have already stated, that at the time of constructing the passenger car on the principle of your invention, or application of a principle, oscillation was prevented in the running of the cars; was this oscillation prevented as well on a straight road as at curves, and did the principle of your invention, which adapted the workings of the car to the curves also operate in a degree while the car was in motion on a straight road?

(The above question is objected to by Mr. Winans, as a leading question.)

A. Yes.

Being *cross-examined* by Ross Winans, the Plaintiff, the said witness answers and says:

I had the direction of the car building, smith-work, passenger car building, and bought all the materials pretty much that were used; I kept all the time, and paid all the hands under me, while in the employ of the Baltimore and Ohio Railroad Company. The first timber carried on eight-wheels on said road, was carried on two ordinary four-wheel cars, used for carrying stone. As to the date, I cannot ascertain it, but so soon as we became acquainted with the advantages of using the eight-wheel car, we made the centre timbers stronger, and placed the wheels closer together; this was done in the latter part of 1831, or along through 1832, certainly in one of those years or the other, and before the building of the eight-wheel passenger cars. At this time the moving power on the said road was horse-power. Some experiments in steam-power were made. Up to the time of the construction of the first eight-wheel passenger car, the power was applied to the truck and not to the body of the car, as it is at present. The trucks were coupled together (independent of the load) by a coupling bar, and not by a body, as at present, but before I left the road, the Columbus, (the first eight-wheel passenger car,) which was coupled by a coupling bar, had also a body for passengers placed on the trucks as a permanent fixture, and it strikes me that this was the first eight-wheel car on said road, having a body as a permanent fixture.

The following, within parenthesis, is inserted at the instance of the Defendant's counsel:

(Here the Plaintiff produced and exhibited to the witness a drawing, and asked the witness if he had that drawing before him at the time he (the witness) constructed the Columbus; to which the witness answered: I recollect distinctly of the drawing of a body of a car, from which the body of the Columbus was made; the Plaintiff, I think, furnished said drawing. For the running gear, I made the drawings myself to work by. The body built after said drawing had a special reference to an eight-wheel car. There was a drawing of the body of a car came into my possession, which body, I think, was painted yellow. While said drawing was in my possession I do not think there was any running gear attached to it.)

Here the Plaintiff was informed that if the drawing then produced was intended to be used for the purpose of examining the witness upon it, the paper must be filed with the Commissioner, whereupon the Plaintiff said that he did not want the paper to go out of his possession, and would withdraw it and decline any examination of the witness in regard to it, but at the same offered to allow a copy to be made and used, if the opposite party wished.

X Q 1. Did you not enter the service of the Baltimore and Ohio Railroad Company in April, 1830? and was not the Plaintiff then in the same service? or if not, when did he enter the service to the best of your recollection? and did he not continue in it afterwards, as long as you did and after you left it? and what was the nature of his employment?

Ans. I entered into the service of said Company in April, 1830. I do not recollect that the Plaintiff was in the service of the said Company at that time; I think he was in England. I have no knowledge of the time particularly when the Plaintiff entered said service, but I think it was in the latter end of the same year. I have no knowledge of said Winans being in the service of the Company receiving wages. I have no doubt of his being in the employ of the Company, but the year and wages I don't know; as far as I know of Plaintiff's employment he was Superintendent over the various machinery departments.

X Q 2. You have stated that the car Columbus was your invention. Please state whether it was the same in principle and mode of operation with the eight-wheel cars now in general use; and if not, what is the difference?

Ans. In reference to the action of the body of the car Columbus on the running gears, I consider it the same as the eight-wheel car now in general use. There is a difference between the cars now and the Columbus in the connection. The point of traction was from the perch in the Columbus to the body. I think this is all the material difference.

X Q 3. What, in your opinion, is the principle of the eight-wheel car now in general use, and was this principle in the car invented by you as stated in your examination in chief?

Ans. The principle of an eight-wheel car I consider to be, in placing a frame work on the fore wheels, and so connected with the body or load as to enable the truck or running gear to move with ease under the load by the body resting on a point at the centre of the truck or running gear, the wheels being brought as near together as possible so as not to touch, and place at a proper distance from each end of the car or load. This enables both sets of wheels or trucks to move at any angle from a right to a straight line. This principle was in part in the car Columbus invented by me, with this difference: that the body and frame work were prepared for Mr. Winans' friction wheels, which at that time were too far apart to carry out the principle successfully and properly, I not having control entirely of the distance the wheels were placed apart. This was afterwards altered, and the wheels placed closer together. We certainly altered the boxes on the Columbus and put the wheels closer together.

X Q 4. What was the distance apart of the axles of the stone cars which you have stated in your examination in chief were used for carrying lumber, and what was the diameter of the wheels of such stone cars?

Ans. The axles of the stone car referred to were not confined to any particular distance apart, but were generally from 2 ft. 8, to 2 ft. 10 in. apart. As near as I can recollect the wheels were 26 inches in diameter on the tread, 28½ inches on the flange.

X Q 5. What was the distance apart of the axles of the trucks under the Columbus as originally built?

Ans. I do not recollect the exact distance, but it seems to me the flanges of the wheels were placed fifteen inches apart.

X Q 6. What was the kind of wheel and axle in most general use on the Baltimore and Ohio Railroad at the time of the building of the Co-

lumbus? Was it not the Winans' friction wheel, with outside diminished bearings?

Ans. A number of passenger cars on said road had the Winans friction wheel. I think it likely that a majority of the passenger cars were built on Mr. Winans' plan. I think there were some passenger cars built without the friction wheel, at the time of the building of the Columbus.

X Q 7. Was not the Winans' friction wheel in great and general favor at the time of the building of the Columbus?

[Defendants' counsel objects to the above question because it refers to the opinion of the public—to general opinion—and not to witness' own opinion or knowledge.]

Ans. I would simply say that the said friction wheel had not the favor of competent judges. There was a very short period of time when it was in favor, but not by competent judges.

X Q 8. Was not the Winans friction wheel in favor at the time of the building of the Columbus, with the officers and parties who took an active interest in the affairs of the Baltimore and Ohio Railroad Company?

[This question is objected to.]

Ans. I don't think I can answer this question in the affirmative, from the fact that there were defects in every car that was built. I was going to state that there were defects in every car that was built in modifications and changes in the plan of building, and I have my doubts whether the patentee himself of the invention was satisfied of its efficiency. It was a good deal like the Fayette Street Bridge. I believe there was a time when the friction wheel was regarded with favor by the officers and parties who took an active interest in the affairs of the Baltimore and Ohio Railroad Company.

In answer to the question of the Plaintiff, as to whether the officers and those who took an interest in the Railroad Company did not hold Winans' friction wheel in favor, the witness desired to know who were meant by the word "Officers;" and he stated that the President and Directors, as far as he knew, were in favor of said friction wheel.

The last seven lines, beginning with the words "in answer," were dictated by the Defendants' counsel, as his understanding of what the witness had previously stated, and had not been taken down by the Commissioner; the said witness being present and confirming the statements therein contained.

X Q 9. You have said, I believe, there was a time when the friction wheel was regarded with favor by the officers and parties who took an active interest in the affairs of the Baltimore and Ohio Railroad, as explained in your answer to the last question. Was this at the time of the building of the Columbus?

Ans. I want to know in favor of whom you mean. The friction wheels were less in favor at the time of the building of the Columbus than previously.

X Q 10. What was your own opinion of the Winans friction wheel at the time of the building of the Columbus?

Ans. My own opinion was that there were defects in the principle of the invention that could never be remedied, so as to make it efficient.

X Q 11. Did not Mr. Winans furnish you with the plan, and direct

you in the construction of the running gear, as well as of the body of the Columbus, or did any one else, or was the plan of the eight-wheel car your own invention?

Ans. Mr. Winans did not furnish me with the plan and direct me in the construction of the running gear as well as the body of the Columbus. As far as my recollection serves me now, I drew down the plan on a scale of an inch and a half to the foot on a board, which I worked by, giving lengths and sizes, &c., and obtained the materials without reference to any other plan than my own.

X Q 12. If you were, as already stated by you, the inventor of an eight-wheel car, and built the running gear without being furnished with a plan by Mr. Winans or any one else, how came you holding the opinions of the friction wheel which you have expressed, to adopt it for the running gear of the Columbus?

Ans. Well, the reason was, that Mr. George Brown had the immediate direction of all such matters, and I generally worked from his directions, as to the quantity and quality of the cars to be made. I do not know that I used the friction wheel under Mr. Brown's directions. I had used the friction wheels on other cars, and knew how to make them as well as Mr. Winans, and without his directions. It was not my province to reject the said wheel, and the principle of it had been adopted by the Company.

X Q 13. Do you say that you put friction wheels under the Columbus, because the friction wheel had been adopted by the Company without any particular directions from any one to do so? Did Mr. Brown direct you to put the friction wheels on the car?

Ans. I cannot pretend to answer such a question as this from memory, and it being so far back. I have already stated that Mr. Brown had direction of these matters. I do not know that Mr. Brown directed me to put the friction wheel to the Columbus.

X Q 14. Was the friction wheel on all the cars belonging to the Company, and if it was not, what do you mean by saying it was adopted by the Company?

Ans. The friction wheel was not on all the cars belonging to the Company. I mean precisely what the City Council meant in adopting Cooper's plan of the Fayette Street Bridge.

X Q 15. What did the City Council mean?

Ans. The City Council advertised for proposals for building three distinct bridges. Three several plans were submitted to the Council, and were taken and bridges built, which is all I consider in adopting the principle.

X Q 16. Do you mean to say that there was a formal action of the Council adopting the Fayette Street Bridge, and that there was a formal action on the part of the Railroad Company adopting the Winans friction wheel which controlled you in building the Columbus, and that therefore the cases which you have put are the same, or what do you mean?

Ans. There was a formal action on the part of the Council adopting the bridges, and I suppose (but do not know of my own knowledge,) there was a formal action of the Railroad Company adopting Winans' friction wheel; I used the friction wheel on the Columbus because I supposed the Company had adopted it.

X Q 16 (?). Do I understand you to say, then, that you were governed in using friction wheels for the Columbus by your supposition that they had been formally adopted by the Company, and not by any direction from Mr. George Brown or others?

Ans. No. I am not to be so understood, because Mr. Brown had the specific direction of such matters, and the order or direction to do it came through Mr. George Brown.

X Q 17. Was not the car Columbus finished in the early part of the year 1831? Try and recollect.

Ans. I do not recollect precisely the time, it was in pleasant weather that the said car first went out.

X Q 18. Look at the drawing now shown you marked A. B., and say whether it is not an accurate representation of the car Columbus to the best of your recollection, and if not, in what respects it is erroneous?

Ans. I have looked at said drawing marked A. B., and to the best of my recollection it is an accurate representation of the car Columbus.

X Q 19. When you built the car Columbus as testified by you, were you not in the habit of consulting with George Brown, George Gillingham and Ross Winans, in reference to said car, and was not the said Winans constantly going backwards and forwards to and from the shop in which the car was built?

Ans. I do not know that Mr. Gillingham was ever consulted, but Mr. Brown and Mr. Winans were. Mr. Winans was frequently in the shop where said car was being built.

X Q 20. Did not Mr. Winans direct you in the construction of the trucks of the Columbus so far as his friction wheels were concerned, and was not the use of the perch directed by him, or was it your own idea?

Ans. The perch had been used on every car that was built, I believe. I do not pretend to say now whether Mr. Winans did or did not direct me in the construction of the trucks of the Columbus, so far as the friction wheels were concerned.

X Q 21. At the time of building the Columbus, did you understand the advantages of the free motion of the trucks of an eight-wheel car upon the centre pins?

Ans. Certainly I did.

X Q 22. How came you then to use a perch to draw by, which controls such free motion? How came you to use it, if it controlled the free motion at all?

Ans. I did not say that the perch controlled the free motion of the car, only in part. I used the perch at all because it was the only plan in use at the time.

X Q 23. Did you understand the advantage of having the wheels of each truck of an eight-wheel car close together when you built the Columbus?

Ans. I understood the advantages of having the wheels close together under any burthen or load. There was no passenger car built at that time.

X Q 24. In inventing the eight-wheel car, as already claimed by you, or in planning the construction of one, had you in view any advantages to be derived from putting the wheels of each truck close together,

and were two trucks with the wheels close together a part of your invention or plan, of which you understood the advantages as particularly applicable to eight-wheel cars?

Ans. I do not know that I ever claimed the eight-wheel car as my invention. In planning the construction of an eight-wheel car, I certainly had in view the advantages to be derived from putting the wheels of each truck close together. I understood the advantages of placing the wheels close together in reference to any purpose for which cars were used on the road. The advantages of putting the wheels of the truck close together are applicable to no other car but eight-wheel cars.

X Q 25. You have already stated that you did not put the wheels of the trucks close together in the eight-wheel car Columbus, because of the employment of the Winans friction wheel. Will you look at the drawing A. B., now shown you, and explain in what manner the use of the friction wheel prevented your placing the wheels as close together as their diameter would allow?

Ans. I have looked at the drawing A. B., and I do not know whether I am able to state why, in this case, the wheels were not put nearer together, but I suppose it was because other cars had been built in the same way.

X Q 27. (?) Would you not have put the wheels close together had you not been controlled by directions given to you in regard to the construction of the running gear?

Ans. The distance had been adopted previously; the distance between the axles on other cars had been adopted previously.

X Q 28. In speaking of the adoption of the distance of the wheels apart, previously, have you not reference to four-wheel cars with the Winans friction wheel?

Ans. Yes.

X Q 29. The car Columbus then, was nothing more than a long car body put on the running gear of two four-wheel cars. Was it, or was it not?

Ans. As it relates to the connection of the wheels and the friction wheels, and the distance of the axles apart, it was the same as the four-wheel car; but as respects the bolster or point on which it turns, there was a material difference; the four-wheel car having nothing of the kind.

X Q 30. The car Columbus then, was a long car body put upon two sets of running gear or trucks, constructed, as relates to the distance of the wheels apart and the mode of traction by a perch, upon the plan used for the four-wheel cars.

Ans. It was with this exception, that there was only one point of traction at each truck.

X Q 31. Do you consider the position of the trucks under the body of an eight-wheel car a matter of indifference, or do you consider one position better than another? and if so, what position do you prefer? Were the trucks which were placed under the Columbus in the first instance in their proper position, and are the trucks of eight-wheel cars as now built usually, or ever, placed in the same position with those of the Columbus?

Ans. I think the trucks of eight-wheel cars as now usually built, are

placed near (?) the ends of the body than those of the Columbus. I do not consider the position of the trucks a matter of indifference. I certainly consider one position better than another, and this depends somewhat on the strength of the body. It was thought, no doubt, at the time the Columbus was built, and most likely it was thought so by me, that the trucks were placed in the proper position.

X Q 33. (?) Who directed you to place the trucks of the Columbus as shown in the drawing?

Ans. I do not know that I had any specific directions about it, further than my own judgment.

X Q 34. In your examination in chief you say, the invention when first invented by me was regarded as an important invention. Did you ever claim it as your invention? and if so, to whom did you make such claims?

Ans. In answer to this question, I would simply state that I had authority from Mr. Brown to make any improvement, and to make any patterns that I saw fit to carry out any improvement suggested to my mind, so it did not run the Company to unnecessary cost, in carrying out any new idea which was suggested to my mind; I made the improvement in using the trucks and swivel bolster on the trucks for carrying long timber. I do not know that I made the claim particularly to anybody further than to talk the matter over to persons I was acquainted with. I made other improvements and carried them out, one other improvement, (considered so then) that is a spring working in a cast iron socket, and this improvement was generally adopted on the road. I always claimed the swiveling principle as my own invention.

X Q 35. Was the shop in which you worked within two or three feet of the shop in which the body of the Columbus was being built under the charge of Oliver Cromwell, and were you not constantly in and out of Cromwell's shop? Did not Reuben Aler work in either the same shop with you or in Cromwell's shop, at the Columbus or parts of it? Did you ever claim the invention to Cromwell or to Aler?

Ans. I think the body of the car Columbus and Cromwell himself were under my charge, and the shops adjoined as stated in the interrogatory. There was only room between them for a person to pass, and hardly that, and I was as often in Cromwell's shop as was necessary. Oliver Cromwell worked in one shop, and I worked in the other. Reuben Aler worked in the back end of the shop in which I worked, but I do not recollect whether he worked there when the Columbus was being built. I do not know that I ever claimed the invention to either Cromwell or Aler, but I did to Jacob Rupp who worked on the running gear.

X Q 36. Do you say that the idea of trucks with swivelling bolsters for carrying long timber was your invention or improvement? Did you not on the trial in Baltimore in 1839, swear that the idea was suggested by a driver on the road?

Ans. Yes, I do say that the idea of trucks with swivel bolsters for carrying long timber on railroads was my invention. I did not, to my knowledge, swear on the trial in Baltimore in 1839, that the idea was suggested by a driver on the road. This driver came into the shop and asked me whether or not I could construct something or fall on some plan to carry timber upon the road; that the great length made it very

difficult to get it upon the cars then in use. I think I told him that I could, and immediately went to work and had them made.

X Q 37. Did you not, on the said trial, state on oath that you did not claim the invention of the Columbus, and that you did not know any one who claimed it, or to this effect?

Ans. The swiveling principle I always claimed, as well in the Columbus as any other car. As to the body or the distance of the wheels apart under the Columbus, I made no claim that I know of. I do not know that I ever claimed any thing in reference to the position of the trucks under the body as to their distance.

X Q 38. To whom of the officers or directors of the Railroad Company did you first suggest the plan of a railroad passenger car with eight wheels before the Columbus was built, and from whom did you receive instructions to go on and build such a car, and did you without direction from any one go on and build the car of your own notion?

Ans. I do not know; I received my orders from Mr. George Brown. I did not consider myself under the orders of any one else.

X Q 39. Was not Mr. George Brown very active in attending to the making of the cars and machinery of the road in 1830, 1831 and 1832? Did you state to him at any time that you had invented a new kind of car which you wanted permission to build, or did you make such a statement or request to Mr. Thomas, the President, or to Mr. Winans, or to Mr. Knight, the Chief Engineer?

Ans. Mr. George Brown was very active at those times. I do not know that I stated to Mr. Brown that I had invented such a car, which I wanted to build. I do not know that I made it to Mr. Thomas, or to Mr. Winans, or to Mr. Knight, the Chief Engineer.

X Q 40. Did you exhibit a drawing of any kind to any of the officers, or directors, or agents of the Company explanatory of your alleged invention, prior to the building of the Columbus, and to whom? or, if not, how did you explain your alleged invention to them?

Ans. I showed nothing more than the drawings I had made on the board of which I have spoken, which I showed to the workmen, and which I had drawn to work by.

X Q 41. You have stated that the Plaintiff furnished a drawing of a car body from which the body of the Columbus was built, had you at that time explained to him or any body else your alleged invention, or had you, when he furnished the drawing, any conversation with him in regard to the position of the trucks, and if so, what was it?

Ans. I do not recollect the conversation which took place when Winans furnished the drawing.

X Q 42. In your examination in chief you say, actual experience on the road showed me the advantage of having the wheels close together, will you now state how many miles of the Baltimore and Ohio Railroad were open and in use for purposes of transportation in 1831 when the Columbus was built, and whether the Company was then engaged in general transportation, and to what place?

Ans. I think the road was open and in use as far as Ellicott's Mills, (fourteen miles.)

X Q 43. In your examination in chief you say, when speaking of your alleged invention that it was suggested by the fact among others, that sometimes in loading a hogsheaf of sugar or other articles, they

rolled to the end of the car and tilted the end down, will you now state whether you ever saw a hoghead of sugar loaded on a railroad car of the Baltimore and Ohio Railroad prior to the spring of 1831, and if so, where was said hoghead loaded?

Ans. I saw a hoghead containing some article put on the road, but I cannot say whether it contained sugar, and it appears to me that this was soon after the road was finished to Ellicott's Mills, the date I do not recollect. It was loaded at Mount Clare depot.

X Q 44. Did the Columbus succeed to your satisfaction when put upon the road on completion, or was it altered from time to time, and if so, in what respect? You will here describe particularly.

Ans. The Columbus when put on the road did not succeed to my satisfaction. It seems to me that there was some defect in the bolster pin. There was a stairway made inside afterwards. It strikes me there were new running gears put under it before it wore out; they were put on for defects in the friction wheels.

X Q 45. Had you determined or had you been ordered to build an eight-wheel car, before you received the drawing of the body from Mr. Winans?

Ans. I had not.

X Q 46. Did you ever ask the said Plaintiff, or any one else, to furnish you with the drawing of an eight-wheel car?

Ans. I did not. There was no necessity for it, because I could make a drawing myself.

X Q 47. How came such a drawing to be furnished you if the invention was your own, and you had never explained it to said Plaintiff, or requested that you might be furnished with a drawing from him or from any one else?

Ans. I do not know Mr. Winans's motive for bringing the drawing to me. I suppose he got authority from the Company to do so.

X Q 48. Was the drawing furnished before or after the Columbus was commenced?

Ans. The drawing of the body of the Columbus was furnished before the Columbus was commenced.

X Q 49. Will a train of eight-wheel cars, with couplings attached to the trucks or perches, pass as easily through curves and turnouts as a train of cars with couplings attached to the bodies of the cars, the trucks being left free to yield to the curve or turnout?

Ans. I should suppose not.

X Q 50. Were trucks ever built expressly for the purpose of carrying timber before the building of the Columbus, or were not the trucks used for timber the common four-wheel cars appropriated to that purpose as wanted?

Ans. I am not certain; but it appears to me that some few were built before the Columbus, but I am not certain.

The examination in chief being resumed, the said witness, Conduce Gatch, deposes and says as follows:

Q. You have seen the drawing shown you by the Plaintiff, on Monday's examination, and afterwards withdrawn by him, purporting to be the drawing of the model of the Columbus built by you. State whether your recollection is distinct that the running gear, as now

shown on that drawing, was or was not in the drawing before you constructed the running gear of the said car, and state what your testimony was on this point, on the trial of the case between Ross Winans and the Newcastle and Frenchtown Railroad Company—a case tried in the United States Circuit Court, for an infringement of Mr. Winans' patent of eight-wheel passenger cars, spoken of in this case?

Ans. It has always been my impression that the body of the car, as it appears on said drawing, was alone on the drawing shown to me before the commencement of the building of the Columbus. The said drawing was some time in my possession. In said drawing, the coloring of the running gear and the execution of the running gear are different from those of the body, and in my examination in the case referred to, my attention was drawn to this by some one who examined the said drawing during the trial of said case.

Q. Had you, or not, testified in said case that the running gear was not on the drawing before Mr. Ellicott made the suggestion?

Ans. Yes; I had so testified.

Q. You have said, in your cross-examination, that the friction wheel of Mr. Winans was defective, and pretty much like the Fayette Street Bridge. Explain what you mean by that answer.

Ans. I meant that it soon came to life and soon was extinct; that is, out of life and out of use. The Fayette Street Bridge fell down before its completion.

Q. After the running gear of an eight-wheel car is constructed upon the principle of your invention, would it not be, in your judgment, within the competency of a mechanic of usual skill to place the body of an eight-wheel car upon the same, so as to work successfully and in like manner with the eight-wheel passenger car of Mr. Winans, or is any new principle of construction adopted in the building of a framework of the body?

Ans. Yes. There is no new principle in the construction of the body to adapt it to the running gear of an eight-wheel car.

Q. You have stated that you made the running gear of the Columbus by your own drawing, made upon a board with the dimensions marked on it. State who was working with you on the running gear; and did you receive any instructions from Winans, or any body else, as respects the construction of the running gear?

Ans. Jacob Rupp was at that time working with me; and I do not recollect to have received any instructions from Mr. Winans, or any body else, as respects the construction of the running gear.

Q. Had Mr. Winans any opportunity of seeing the application of the principle of your invention applied in actual use on the cars upon said railroad? and do you know of his having seen it in use?

Ans. Certainly, Mr. Winans had an opportunity of seeing my principle in operation. I suppose he saw my principle in operation; Mr. Winans was on the road, and passing up and down.

Q. Are Winans's friction wheels in general use on the eight-wheel passenger cars?

Ans. None of them are now in use, to my knowledge.

Q. When you say that swivel trucks, with bolsters for carrying long timber on a railroad were invented by you, did you mean that that object alone was effected? and did, or did not, the principle of your

invention produce all the advantages mentioned in the specification of patent S. P.

Ans. Certainly, my principle attained all the advantages mentioned in the specification S. P., and all the advantages now derived in the use of the eight-wheel car now in general use throughout the United States. The eight-wheel car now in use would be useless without the swivel principle.

Q. Were you not sufficiently acquainted with drawing at the time of building the Columbus, to enable you to make the drawing of the running gear and any description of drawing requisite, as a model for your work?

Ans. Yes.

Q. Did you ever hear Mr. Winans claim as his invention the principle of the running gear of the Columbus, or any eight-wheel passenger car, at or before the time of the building of the Columbus? and when did you first hear of his claim as an inventor of an eight-wheel passenger car?

Ans. I never heard at or before the building of the Columbus, Mr. Winans claim as his invention the principle of the running gear of the Columbus, or any eight-wheel passenger car, and I never heard of his claim until after his patent was taken out.

Q. Having heard read the specification of Mr. Winans' patent, and what improvement he claims as having made in the manner of arranging and connecting the eight-wheel cars, which constitute the two bearing carriages with a railroad car, is there any thing new in principle as set forth in said specification, and was known to you before the date of his patent, viz: October 1st, 1834?

Ans. I think not.

CONDUCE GATCH.

DEPOSITION OF ROBERT S. HOLLINS.

Questions put to ROBERT S. HOLLINS, a witness for Defendant, deposes and says as follows:

I reside in the city of Baltimore, and am Secretary of the Baltimore and Susquehannah Railroad Company, and have been since 1835. I am acquainted with the manner of constructing the cars, both passenger and burthen, on said road. There are eight-wheel passenger cars on said road, and the first of said cars which were run on said road were built by Dexter C. Force, who then resided in Baltimore, and the rest of said cars were built at the depot of said road; James Milholland is the foreman at said depot; on said road they find that the eight-wheel cars run with greater ease on the road than the four-wheel cars, and with greater safety to the passengers. This is effected by having eight wheels instead of four, and the eight wheels are on trucks separate and distinct from the body of the cars, by which they are enabled to give great length to the cars, and prevent the pitching generally attending the running of a four-wheel car at high speed, and this pitching is prevented by being enabled to bring the trucks on which the body is supported near the end of the body. The eight-wheel car also adapts itself to the curves of the road.

Q. 2. (?) Were the four-wheel cars you have stated to be in use on the

road, constructed in the same manner as regards the running gear as the eight-wheel cars?

Ans. No; they were not constructed in the same way. They are entirely different, because the body and the running gear of a four-wheel car form one and the same thing; the body of an eight-wheel car is separate and distinct from the trucks of an eight-wheel car, they being connected by coupling pins running through the centre of the truck frame, and the coupling pin is the connection between the body and the trucks; and if the coupling pin were to break, the body would separate from the truck. I do not see any difference between the running gear of an eight-wheel car, as used on the Baltimore and Susquehannah Railroad, and a four-wheel car, except that the wheels are a little closer generally, and that the trucks are always made much stronger than those for a four-wheel car in order to bear the increased weight put upon them.

We find it a disadvantage to have a four-wheel car going at great speed on the road. You could not run a car of the length of an eight-wheel car on four wheels on our road; it is necessary to have trucks to get round the curves, and running the car on trucks is like running a series of four-wheel cars; the action is nothing more or less than taking cars connected and stretching them on a curve, then take two car bodies built for an eight-wheel car and lay one body on two of the four-wheel cars, and attaching that body to the cars by a pin in the centre of each car, and this shows the operation of the trucks adapting itself to the curves. The bodies in both descriptions of cars are made alike, except that the body of an eight-wheel car is longer, and that at the point of support between the body and the truck there is a heavy timber put in, known as a bolster, and that between the running gear there is also across the centre of the truck or running gear a heavy piece of timber (or iron, I have seen iron ones.) On our road, it is a heavy piece of timber which forms a part of the body, and also a part of the running gear of the car.

I have heard read the specification marked S. P., and I know of no difference between the description there and the cars used on our road, except the wheels used in our cars are not placed as close together as they might be according to the description in the specification S. P. There is not anything in the principle of the construction of our cars which would prevent the wheels being brought close together, if it were deemed expedient to do so. The eight-wheel cars and all-eight-wheel cars have their wheels put close together to avoid the friction mentioned in the specification S. P. The effect of the friction is the same as is described in the specification, namely, injury to the wheel and injury to the rail.

In constructing four-wheel cars the object is to get the wheels as close together as possible to avoid this friction, and in a four-wheel passenger car the ends of the body project over the axles of the wheels a considerable distance, and at high speed the body naturally gets a pitching motion, which motion is avoided in the eight-wheel car. On a straight road the four-wheel car would pitch as much and probably more than it would on a curved road, when going at high speed. I have never seen a straight road. On our road the eight-wheel car runs with less vibration than the four-wheel car, and this promotes the ease of the

passengers. At the time the eight-wheel cars were built on our road, Isaac R. Trimble was the Engineer of the said road.

On reflection I state, that for the first cars built for the Company the trucks were made by Ross Winans. The cars built by Force were built under the direction of Mr. Trimble, who was at that time the Engineer of the road. Mr. Trimble the Engineer, sent an Engineer to Newcastle to get the drawings for four and eight-wheel cars, and this was about the time Force built the cars for the Company. When Mr. Winans built the trucks above spoken of for our Company, he sent a young man to take the dimensions. The said trucks were built under the direction of Mr. Milholland, the Superintendent of Machinery on our road. Said Ross Winans is a machinist, and has done work for our Company at different times; he has cast wheels for us, made patterns, but I do not recollect of any machinery at this moment, except the trucks above spoken of. Said Winans has brought no suit against our Company for any infringement of his patent. I have an indistinct recollection of a letter of Mr. Winans to the Company, but whether it was about this patent I do not recollect. I think said letter was a claim made by Winans against the Company for the infringement of a patent. I will furnish a copy to be annexed. (See letter on page —.)

Cross-interrogatories addressed by Plaintiff to Robert S. Hollins.

X Q 1. Have you ever been engaged practically in the construction of cars or machinery of any kind as a business, or are you an engineer by profession?

Ans. No.

X Q 2. What is the date at which the first eight-wheel cars used by the Baltimore and Susquehannah Railroad were constructed?

Ans. In August 1838, (eighteen hundred and thirty-eight) the first eight-wheel cars used by the Baltimore and Susquehannah Railroad Company were constructed.

X Q 3. You state, in your examination in chief now referred to, the difference between an eight and four-wheel car, and the comparative advantages of the two. Do I understand you to say that these are all the advantages?

Ans. In an eight-wheel burthen car you can probably carry more articles than you could in two four-wheel burthen cars. In speaking of articles, I mean some articles; for in regard to the article of iron, you can take as much in one description of car as in the other. In an eight-wheel passenger car you can carry more than double the number of passengers you could carry in one four-wheel car; you are enabled to construct the car on eight wheels so much longer.

X Q 4. In view of the advantages believed by you to exist in an eight-wheel car, was it not a valuable and important invention in your opinion? and is it not now, so far as your knowledge goes, in general use throughout the United States?

Ans. I answer in the affirmative, Yes.

X Q 5. Is not an eight-wheel car a machine perfect in itself, and dependant for its most advantageous action upon the proper adjustment of its parts, in their relations one to another?

Ans. Yes.

X Q 6. Is not the point of traction of the running gear of a four-

wheel car on front of the car, and does not this, together with the rubbing of the flange on the rail, control the direction of the wheels? Is not the point of traction of the trucks of an eight-wheel car in the centre of the four wheels of each truck, and are not the wheels thus left free to be controlled by the curves and inequalities of the road?

Ans. Yes; I answer to both in the affirmative.

X Q 7. Can you take two sets of running gears of four-wheel cars as now constructed, or as constructed in 1834, and without altering or preparing them in any respect, or adapting them to their new purpose, convert them into an available and useful eight-wheel car, by placing a long car body upon them?

Ans. No, not without alteration and adaptation for that purpose. That is to say, you must put a bolster on the top of the four-wheel cars, connect the body to them by coupling pins, and bring the axles closer.

X Q 8. Would it not be better and cheaper in all respects to build new trucks, especially adapted to the use of eight-wheel cars, rather than undertake the alteration of two four-wheel cars, as running gear for that purpose?

Ans. Certainly it would.

X Q 9. Are not the difficulties to be overcome by the use of an eight-wheel car, and the best mode of overcoming them clearly set forth in the specification S. P., and are not the eight-wheel cars now in general use, according to the best of your knowledge, constructed upon the principle therein explained?

Ans. Yes, but I have no reference to the pretensions of Winans as patentee.

X Q 10. What was the date of taking the dimensions of cars on the Baltimore and Susquehanna Railroad, by or on the part of Mr. Winans, of which you have spoken in your examination in chief?

Ans. I think it is about a year ago.

X Q 11. In the construction of an eight-wheel car, is there any new principle in the construction of the body of the cars differing from those of a four-wheel car, and could not a four-wheel car body be placed on an eight-wheel running gear, and if not, what special alteration must be made?

Ans. It is no part of my duty as Secretary, but having a turn for mechanics, I turn my attention at times to the various improvements in Railroad cars, and examine such as are made and in use on the road of which I am Secretary. I think I have sufficient knowledge to judge of the effect produced by the adoption of the principle of construction of railroad cars. In referring in my answer to the third cross-interrogatory to the advantage of an eight-wheel passenger car in carrying more passengers, I mean this in addition to the advantages mentioned in my answer in chief. The eight-wheel cars in use on our Railroad fulfil all the conditions of the specification S. P. The cars built by Mr. Force were built on the same principle as those now in use on the road, and of all eight-wheel cars on the road—the principle is the same—in some the wheels may be heavier and the timber may be heavier in some, but the principle is the same.

X Q 12. Explain the difference in principle, if any exists, between the action of a wagon having on a single bolster and an eight-wheel

passenger car, and what would be requisite to make the principle on which a wagon is turned apply to the running of an eight-wheel passenger car, and what is the necessity of a swivel bolster?

Ans. The frame of a body of a four and of an eight-wheel car are similar, except the difference in the length of the two, and that the body of the eight-wheel car has an upper bolster for the purpose of supporting the weight of the body, and forming the socket for the coupling pin. The running gear of a four-wheel car and the truck of an eight-wheel car are similarly constructed, except that the axles of the trucks are placed closer together and that the said trucks have an under bolster, I believe this all the difference. In all our cars the upper bolsters is a fixture of the body, and the under bolster is a fixture of the running gear. In the common road wagon the upper bolster is separate and distinct from the body of the wagon and also from the lower bolster; the lower bolster is attached to the axle and forms a part of it. The principle is the same in the bolster of a common wagon and the bolster of an eight-wheel car, but it is not operated in the same way; the operation of the turning of a wagon is by the moving power, and in an eight-wheel car it is by the curvatures and inequalities of the road. We have transported lumber on our road on two four-wheel cars, but then it has been done by adding bolsters to the cars.

X Q 13. Is the body of an eight-wheel car before being placed on the truck or running gear different from a four-wheel car in any other respect than dimension in length and addition of a bolster?

Ans. I consider the forward trucks of a railroad car as the same in principle as the front bolster and wheels of a wagon, and the difference is that the hind wheels of the wagon are in place of the hind wheels of the car, and as the hind wheels may be considered as a permanent fixture, the hind truck to be the same in principle with the hind part of the wagon should be permanently fixed to the car body, and therefore would be useless on a railroad.

X Q 14. In constructing an efficient eight-wheel car must there not be such a construction of the body in reference to the trucks as to unite the two safely and permanently together for the regular transportation of passengers or merchandise?

Ans. No, there is a difference. The eight-wheel cars which I have seen have always been alike in principle, and the wheels and axles of such cars have been arranged in the manner set forth in the specification S. P. I have heard read from the said specification what the patentee claims as his invention, and I see nothing different in construction of the eight-wheel car patented, and the eight-wheel cars I have seen in use.

X Q 15. Are not trucks used in eight-wheel cars built for that purpose expressly? or do you take trucks constructed for other purposes, and use them without alteration as eight-wheel car trucks, restoring them to their former uses when not wanted for eight-wheel cars?

Ans. Yes.

X Q 16. Are not bodies used in eight-wheel cars built for that purpose expressly, or do you take car bodies constructed for other purposes, and use them without alteration in eight-wheel car bodies, restoring them to their former uses when not wanted for eight-wheel cars?

Ans. The bodies of eight-wheel cars are built especially for the purpose.

X Q 17. If two four-wheel cars standing on the road and built for general purposes are taken and used temporarily for the transportation of timber, as spoken of by you in your examination in chief resumed, is a permanent machine of well adjusted parts thereby produced, any more than a quadruped would be produced by the use of two men with pads on their shoulders to carry a long pole?

Ans. Trucks are constructed with especial reference to their use for eight-wheel cars.

X Q 18. In the examination in chief resumed, you explain the difference in the operation of the principle on which the common wagon operates from that of an eight-wheel passenger car in view of the hind wheels of the common wagon being stationary. Explain what addition or alteration must be made in the common wagon to enable it to operate on a road upon the same principle as the eight-wheel passenger car?

Ans. I answer in the negative. I consider the eight-wheel car body the same as the four-wheel car body, except that it is longer and has to be built stronger, because it has to be supported at the ends. To carry out the principle complete, instead of a single pair of wheels to the bolster of the wagon, there should be another pair, and in place of the hind wheels and axle being stationary, they ought to have a play on the centre of a bolster and an additional pair of wheels.

BALTIMORE, Dec. 14th, 1839.

CHARLES HOWARD, Esq.,

President Baltimore and Susquehannah R. R. Co.

Dear Sir:—At the close of my interview with you a few days since in regard to my claim for compensation for the use by the Susquehannah Railroad Company of my eight-wheel car patent, you expressed a desire to hear from me again before I made up my mind finally to decline the offer of compensation made me through you.

The sum named by me was five hundred dollars, that offered by you was three hundred and fifty dollars, to accept which would do more harm to my claim than the amount paid would compensate.

If my claim is a good one, my demand is most moderate. To accept of less would be to admit that it is doubtful or bad. This I could not do; the confidence of my counsel, settlement recently made after a full investigation, and under which I was paid what I would have willingly taken before suits were brought, would prevent my doing so were my own confidence less strong than it is. I must therefore respectfully adhere to my proposition as the most favorable one that I could offer you, and the terms of which are lower than they would otherwise be, were I not desirous to settle at once with the only road leading from Baltimore which has not yet admitted my right and paid me. Should you still decline acceding to my terms, I shall be obliged, as you must at once see, to bring suit in self-defence, and this must be done in the Court of Pennsylvania, into which State your road runs. The settlement of the case there will make the law of that State, where I have numerous claims to urge that would be settled at once on a decision in my favor against you there, but which might be opposed and resisted

were such a decision to be made in Maryland, the decision of the Circuit Court of which would have no binding authority on the Circuit Court in Pennsylvania. In thus speaking of a suit, nothing is further from my purpose than to do so by way of threat, or to induce you to a settlement that you would not otherwise make. I am most desirous to secure the good will of those who use my inventions, and I am anxious to satisfy you that the course I may have to pursue is not the result of temper on my part, but is intended to maintain what to my mind at least is an honest claim.

Very respectfully yours,

ROSS WINANS.

True copy from originals on file in this office.

ROB'T. S. HOLLINS,

Sec'y Baltimore and Susquehannah Railroad Co.

June 7th, 1848.

DEPOSITION OF JOHN C. A. SMITH.

JOHN C. A. SMITH, for Defendant, deposes and says as follows :

I am now employed as foreman in the carpenter's shop for building cars of the Baltimore and Susquehannah Railroad Company, and have been in the employ of said Company since 1831 ; my knowledge of the construction of cars enables me to speak of the principle of their construction and action upon railroads. I consider the advantage of an eight-wheel car over a four-wheel car to be used on a railroad, to consist in this : that you could not construct a four-wheel car to carry the same burthen as an eight-wheel car ; the great difficulty in my mind would be to make the four-wheel car adapt itself to the curves. The difficulty consists in this : that in a four-wheel car you would have to place your wheels so far apart to support the load that it would not go round the curves. I speak of the use of four-wheel cars for general purposes. The principle of the eight-wheel car, which enables it to go round the curves on the road is, so far as I know, simply the bolster working on a pivot.

Q 2. (?) You have had read to you the testimony of Mr. Conduce Gatch, as to the principle of his invention as applied to the construction of eight-wheel railroad cars, and you have had read to you the advantages and objects to be obtained by the construction of the eight-wheel passenger car of Mr. Winans, as set forth in his specification of patent. State whether, in your opinion, all the objects claimed to result from the use of Winans' car are, or are not, dependant upon the same principle as that set forth in the testimony of Mr. Gatch respecting his alleged invention ?

Ans. I am now employed as foreman in the carpenter shop for building cars of the Baltimore and Susquehannah Railroad Company, and have been in the employ of said Company since 1831 ; my knowledge of the construction of cars enables me to speak of the principle of their construction and action upon railroads. I consider the advantage of an eight-wheel car over a four-wheel car to be used on a railroad, to consist in this : that you could not construct a four-wheel car to carry the same burthen as an eight-wheel car. The great difficulty in my mind would be to make the four-wheel car adapt itself to the curves.

The difficulty consists in this : that in a four-wheel car you would have to place your wheels so far apart to support the load that it would not go round the curves.

I speak of the use of four-wheel cars for general purposes. The principle of the eight-wheel car which enables it to go round the curves on the road is, so far as I know, simply the bolster working on a pivot. Yes, I consider that all the objects claimed to result from the use of Winans' car, are dependent upon the same principle as that set forth in the testimony of said Gatch respecting his alleged invention.

The Defendant's counsel asked the above question of the witness, he being an expert.

The said witness further says : I know Conduce Gatch, and his reputation as a workman is generally considered good. I have always understood that said Gatch was a good mechanic and builder of cars ; said Gatch has superintended the building of cars to my knowledge. (Objected to by Plaintiff's counsel, because Gatch's reputation as a mechanic was not assailed.)

The witness further says : I do not consider there is any difference in the construction of the eight-wheel car and the four-wheel passenger car, except in the length of the former over the latter, and the bolster placed on the body of the eight-wheel car body. I don't see anything whatever in Mr. Winans' specification or the objects intended to be attained by his patent, which would not be accomplished by the ordinary truck being placed under the car body with four springs on the boxes. I have heard read the specification S. P., and there is nothing in what Winans claims different in principle from that set forth in Mr. Gatch's testimony. I understood Mr. Gatch's testimony to be, that he had a common wagon bolster to a four-wheel car, and I consider that this is all that is sufficient to adapt an eight-wheel car to be used on a railroad to advantage over a four-wheel car. In the four-wheel car, in going at a fast speed, there is a pitching motion and side motion.

X Q 1. What is the distance apart of the four-wheel car axles used on the Susquehannah Railroad ?

Ans. The distance between the axles of a four-wheel car used on the Susquehannah Railroad is from forty-four inches to five feet.

X Q 2. What is the distance apart of the axles of the trucks of the eight-wheel cars used on that road ?

Ans. We generally make them from forty to forty-four inches apart.

X Q 3. Do you think that the same advantages would be obtained by putting the axles of the trucks as far apart as the axles of a four-wheel car ?

Ans. Well, so far as regards this, I must speak from experience. We have generally made the axles of the lime cars four feet and eight inches apart, and do not see that there would be any material difference if we were to make the axles of the trucks of the passenger cars as far apart.

X Q 4. Have you ever made the trucks of the passenger cars with axles four feet eight inches apart, and if so, when and how many ?

Ans. We never made any with axles four feet eight inches apart.

X Q 5. Do you think the distance apart of the axles of trucks of eight-wheel cars a matter of indifference ?

Ans. Yes, I do consider it a matter of indifference ; I believe that

when you get the axles apart above the breadth of the road, there is a great difference.

X Q 6. Will a truck with axles four feet eight inches apart go through a switch or turnout, as easily and with as little friction as a truck whose axles are three feet four inches apart?

Ans. I do not know whether it will or not.

X Q 7. Are not trucks used in eight-wheel cars built for that purpose expressly, or do you take trucks constructed for other purposes and use them without alteration as eight-wheel car trucks, restoring them to their former use when not wanted for eight-wheel cars?

Ans. We make trucks used in eight-wheel cars expressly for such cars.

X Q 8. Are not the bodies of eight-wheel cars built expressly for the purpose, and with reference to their being properly and permanently attached to the trucks by suitable bolsters and bolster pins?

Ans. I answer in the affirmative.

X Q 9. What is the average length of the eight-wheel car bodies on the Baltimore and Susquehannah Railroad?

Ans. From twenty-eight to forty feet.

X Q 10. In a forty foot car, what would be the proper distance from each end of the upper bolster?

Ans. The distance is from six feet six inches to five feet, and this is the distance without reference to the length of the car.

X Q 11. Suppose you had a dozen pieces of forty feet six by six string pieces to be transported on two trucks with bolsters, would the proper distance of the bolsters from the ends of the timber be also from four feet six inches to five feet?

Ans. I would accommodate the trucks to the most advantageous carriage of the timber, to prevent its swagging or dipping at the ends.

X Q 12. Are not passenger cars framed expressly with a view to permit the trucks being placed as near the ends as you have described without their swagging in the centre?

Ans. Yes, we brace them to prevent the car from swagging in the centre.

X Q 13. Is not the proper position of the trucks of the eight-wheel car a matter of adjustment and experience, or is it a matter of indifference?

Ans. It is a matter of adjustment and experience, and not of indifference.

X Q 14. In what do you consider the improvement referred to in the testimony of Conduce Gatch, of which you have spoken in your examination in chief to consist?

Ans. I consider it to consist in all that is necessary to make an eight-wheel car adapted to running on railroads. I consider it to consist in two bolsters, one placed on the other with a bolster pin.

X Q 15. Do you consider that the invention described in the specification of Ross Winans, is the same as that mentioned in your answer to the last interrogatory?

Ans. Yes, as far as concerns the bolsters.

Direct Q. Are not the same results produced by the invention men-

tioned in Gatch's testimony as his, as are produced by Winans' specification?

Ans. Yes, I think they are.

J. C. A. SMITH.

DEPOSITION OF REUBEN ALER.

REUBEN ALER, a witness for Defendant: and the said witness deposes and says as follows:

I was employed on the Baltimore and Ohio Railroad about fifteen years. I went there in 1828, and left in the early part of 1829. I went back in the latter part of 1829, and left it again, I believe, in December of 1829, and went back again on said road in March 1830, and left it again in July, 1830; went there again on the first of January, 1831, and remained in the employ of said Company from that time to 1843.

Q 1. You have heard read Mr. Conduce Gatch's testimony as to the improvement made by him and used on the Baltimore and Ohio Railroad. Did you at any time when in the service of said Company, see the principle of Mr. Gatch's alleged improvement put into practical use? and when was it, and what were the advantages resulting from it, in your opinion? Mention what they were, and how they were produced?

[The Plaintiff's counsel objects to the question.]

Ans. I saw in the month of July or August, 1831, the hands on the Baltimore and Ohio Railroad Company hauling logs, and they had a difficulty in loading them and how they should get them on single cars. I think the idea was first suggested by a man named Wentz; says he, "why not go and get a bolster and put on the top of them cars and make a common wagon of them at once, for they'll work as any common wagon." The bolsters were made by some of the hands in the shop, I cannot say certainly by whom, but I think a man by the name of Rupp, who was under Mr. Gatch, worked on them, and when made, the timber was loaded on the cars and found to answer the desired effect. The advantage of this arrangement of the two cars was, that it enabled the cars to traverse the curves as easily as a single four-wheel car would. I do not know of any other advantage except to adapt the cars to the curves, because on a straight road a log of any length might be carried in a single car, provided that the car was long enough.

I consider that all the advantages attained in the eight-wheel car now in general use, were attained in the application of the bolster to the common four-wheel car for the transportation of lumber. I have read the specification S. P., and the objects of the eight-wheel car as set forth in said specification were obtained in Gatch's application of the bolsters to the cars for hauling lumber. The same principles and advantages were attained in Gatch's application of the bolster, but I see by Mr. Winans' specification that he claims a patent for the mode of constructing those cars. I think the objects and advantages stated by Mr. Winans in his specification as being had in view by him were obtained by the application of Gatch of the bolsters as testified by said Gatch in his evidence.

Here the further examination of the said witness, Reuben Aler, was

postponed and adjourned over to the ninth day of June aforesaid, on which day the said witness appeared, and his examination being resumed by the Defendant's counsel, he deposed as follows :

I would like to qualify my previous testimony as to Gatch's improvement. I mean to say by Gatch's improvement, that he being superintendent of the shop, under whom the hands worked, by whom it was done, is the reason why I say Gatch's improvement, because all work done in his shop under his direction we call his work. The advantages of this principle were that it enabled them to use single cars or trucks with their wheels coupled closer together than they were in the habit of making them, and it enabled the cars to turn curves easier in hauling lumber. I had never known Gatch's improvement applied to a Railroad car before the time he did it, because the first Railroad cars I ever saw were on the Baltimore and Ohio Railroad, and I believe said road was the first road in successful operation in this country. I believe it was considered by some a matter of great importance, but I never so considered it, because I considered it as only merely applying the same principles which are in every common wagon or coach. I considered it useful as applied to railroads. The railroad was new and the cars were new in this country, and the application of the principle was as new as either of them.

I cannot recollect distinctly when I first heard that Mr. Winans claimed to be the inventor of the eight-wheel passenger cars, but I think it was some two years, from two to three years after I had seen the principle applied on the said road before I heard of Mr. Winans' claim of invention. When I heard that Mr. Winans claimed a patent for this, I observed to some one who was speaking of it, that I did not know how he could claim a patent for it, for it was as old as the oldest common wagon, and perhaps I said this had been done in hauling lumber on the road. I know Conduce Gatch, and have known him eighteen years.

Ques. 2. What is his character as a workman? (Question and answer objected to by Plaintiff's counsel.)

Ans. His character as a workman was that he was a good workman, a good millwright, and considered a good mechanic. He was in 1830 and 1831 employed on the Baltimore and Ohio Railroad as Superintendent of the carpenters and millwrights, wheelwrights and coach-makers in the construction of railroad cars. There were no car builders in this country until 1830.

And the witness, Reuben Aler, being *cross-examined* by the Plaintiff's counsel deposes and says as follows :

X Q 1. In carrying the lumber as you have described were the ordinary stone cars used or were trucks constructed especially for the purpose?

Ans. The ordinary stone cars were used.

X Q 2. When, to your recollection, were the first trucks built for eight-wheel cars, having the wheels placed closer together than in four-wheel cars?

Ans. I am not able to state the time exactly, but it was in the year 1831.

X Q 4.(?) For what cars were they built?

Ans. They were built for the car Columbus.

X Q 5. What was the distance apart of the wheels of the Columbus?

Ans. I am not able to answer this question. I had nothing to do with the construction of said car, and merely saw it in passing to and fro through the shop while the hands were at work upon it.

X Q 6. What was the distance apart of the wheels of the stone cars used in carrying lumber?

Ans. I do not recollect this distinctly; we had no rule in particular that I recollect. I worked on cars and the measurement of the wheels apart was generally given me on a rod by Mr. Gatch. The distance between the wheels varied from four and a half to five feet, as well as I recollect. In some of the passenger cars the wheels were a great deal farther apart than in others.

X Q 7. Look at the drawing A. B., and say whether, to the best of your recollection it is a true representation of the car Columbus, and if not, in what respects does it differ? state them all.

Ans. I do not think it is. It differs in the trucks; the said drawing shows the perch to run all the way through, while, to the best of my recollection, the perch only ran half way through in the Columbus. My recollection is, that the perch stopped at the bolster and was connected with a pair of hounds. The pannels of the body in said drawing appear to me to be wider than they were in the Columbus. I think the railing on top is represented differently, but I cannot say positively.

X Q 8. Do you consider what you have spoken of as Gatch's improvement, as anything more than the application of the bolsters of a common wagon, one swivelling on the other, to railroad cars, to enable them to carry long timber as you have described?

Ans. I do not consider the application to railroad cars was more than I have already stated. I have stated that it adapted itself to the curvatures of the road and enabled them to haul timber of any moderate length by the use of the bolsters swivelling one on the other. No. I do not consider Gatch's improvement as anything more than the application of the bolsters of a common wagon one swivelling on the other to enable them to carry long timber as I have described.

X Q 9. What was Gatch's occupation before and after he left the Railroad Company's service?

Ans. Said Gatch followed the millwright business, and still follows that occupation.

The *examination in chief* being resumed by the Defendant's counsel, the said witness deposes and says as follows:

3. (?) The advantages of the application of Gatch's alleged improvement, if applied to the construction of eight-wheel passenger cars are, that it enabled them to build cars much longer, which are safer and the side motion of the cars is done away with.

Of course they can apply the trucks to cars of any moderate length and of course being on two trucks, they are not so apt to tilt or have a jumping motion. Of course the distance of the wheels apart is a matter of importance, because the nearer the wheels are brought together, the easier the car runs on a curved road. I do not know that the effect of making the cars run easier by placing the wheels close together, was observed by me at the time of the use by Gatch of the application of his principle.

X Q 10. (?) Had your attention been turned to the effect spoken of in the last interrogatory, do you think that the pinciple so applied would or would not have developed that effect in its practical operation. (This question is objected to as a leading question.)

Ans. I certainly think it would, provided my attention had been called to it at that time.

Q 4. In your answer to the seventh cross-interrogatory, you speak of the advantages of Gatch's invention as connected with the transportation of timber, would that principle apply only to the transportation of lumber?

Ans. I do not mean to say that it is confined entirely to the transportation of timber. It may be applied to the transportation of any thing else whatever, or any kind of cars.

I wish to add in reference to the date mentioned on the first part of my examination, that I fix those dates entirely from my recollection, and that from the fact that Colonel Small went into the Railroad Company's service in April 1831, and that subsequently in June of that year, he employed me to do out-door work, and it was while I was so engaged in out-door work that lumber was transported on the railroad cars as before mentioned by me. The Columbus made her first trip on the twelfth of September, 1831, to the best of my recollection.

REUBEN ALER.

DEPOSITION OF JAMES B. DORSEY.

ROSS WINANS vs. TROY & SCHENECTADY RAILROAD COMPANY.

Deposition of JAMES B. DORSEY, a witness for the Defendants.

That his occupation is that of a Railroad Machinist and Engineer, and he is now in the employment of the Baltimore and Ohio Railroad Company, and has been in said employment uninterruptedly for two years and a half past; that he was first in the employment of the Newcastle and Frenchtown Railroad for five years; then for between one two years he was engaged on the St. Marks and Tallahassee Railroad; and lastly, as before stated, in the employment of the Baltimore and Ohio Railroad Company.

Deponent has knowledge of the construction of railroad cars and has constructed them; he has constructed four-wheel cars and eight-wheel cars; he has knowledge of the construction of the eight-wheel passenger cars now in use on the Baltimore and Ohio Railroad, and said cars are constructed according to the specification marked (Exhibit, S. P.,) which is now shown to him, and which he reads. The eight-wheel car has advantage over the four-wheel cars. In the first place, the load will be carried more steadily, because the center of gravity or point of contact is not immediately over the wheels. The next advantage depends on the kind of road; when there are abrupt curves to overcome, it can be better accomplished by the wheels of each truck being placed closer together, and thus they adapt themselves to the curves of the road. A car of large capacity can be made to be put on them. As to the principle of eight-wheel cars, he first saw it applied in the winter of 1831 and 1832, while in the employment of the Baltimore and Ohio Railroad Company, and where it was employed in the transportation of long timber on two ordinary four-wheel cars. There

was a bolster on the platform of said cars on which the timber was laid, and the bolster so used acted on the same principle as the bolster on the fore wheels of a common road wagon.

Deponent does not know who applied said bolsters to the cars of which he has first spoken. The cars came from the depot of said road to that portion of the road where Deponent was there employed.

Deponent has constructed the eight-wheel passenger cars, and constructed them for the Newcastle and Frenchtown Railroad in 1834, to the best of his recollection. After the discovery of the log-carriage or timber carriage before spoken of, and *previous to his constructing* a car, Deponent saw an eight-wheel passenger car, which was on the Baltimore and Ohio Railroad, in the latter part of the winter of 1831 and 1832, and which was constructed at the workshop of said Company. His knowledge of the construction of the eight-wheel passenger car was not derived from Mr. Ross Winans in person, but his knowledge was derived from his own observation and seeing the cars that were constructed and used on the Baltimore and Ohio Railroad. The person who constructed the cars at Baltimore told Deponent that he had constructed them under the direction of Ross Winans. Oliver Cromwell was the man who constructed them. Gatch was a wheelwright and a general boss, or superintendent. Deponent ought to have said car, for at that early date only one car had been constructed on the Baltimore and Ohio Railroad.

When Deponent was on the Newcastle and Frenchtown Railroad he proposed to build eight-wheel cars for said road. The Directors, to whom he made the proposition, doubted the utility of them, and to convince them of the utility, Deponent constructed a rough eight-wheel car, by placing a long, rough frame on two common platform four-wheel burthen cars; he then exhibited the car to them, and received instructions to go on and build cars in a more permanent manner, for the use of merchandise. Then under directions from the Directors, he went on to construct passenger cars, and while engaged in constructing these passenger cars, Deponent visited Baltimore and examined the cars which had been constructed on the Baltimore and Ohio Railroad, and in a conversation with Mr. Winans on that occasion, he informed Deponent that he had a patent; and *Deponent went on* and constructed the cars, *regardless of his patent*, as he considered it invalid and so told Mr. Winans. The substance of his remarks was, that there had been eight-wheel cars constructed or planned in Europe. Winans said that they were not constructed for the same purpose—turning of curves—and that they did not accommodate themselves to curves. Deponent argued that the English cars were constructed on eight wheels, and that that car and those constructed here for hauling timber with the swivel principle, contained the principle of his patent or claim, presuming his patent to be for an eight-wheel car; and Deponent had seen Mr. Winans' car. At the time of his observation of the swivel principle as applied to the transportation of timber, the idea suggested to his mind of the application of this principle to an eight-wheel passenger car.

Q 2. (?) At the time of the observation you made of the application of the swivel principle in the transportation of timber, and when the advantages to be derived in its adaptation to passenger cars occurred to you, as you have already mentioned in your testimony, did you then,

or at any subsequent time, mention the utility of an eight-wheel passenger car, constructed upon the same principle, to any person, or did you remain silent as to these supposed advantages?

Ans. He does not know that he communicated this idea to any one; he does not recollect any person that he communicated it to. He made mention of these advantages, but to whom at this time he cannot recollect.

Deponent has read the specification of Winans' claim, marked "Exhibit S. P.," and the swivel principle which he saw in use for transportation of lumber on the Baltimore and Ohio Railroad is essentially the same as the car mentioned in said Winans' specification. The timber did pass the curves, but a closer proximity of the wheels would have better accommodated them to the curves. The proximity of the wheels did suggest itself as an advantage to Deponent's mind. There is nothing in the frame work of the body of an eight-wheel passenger car different from the body of a four-wheel car, except the attachment of the bolsters, and a necessary strengthening as you extend the body.

Deponent built the first eight-wheel passenger car for the Newcastle and Frenchtown Railroad Company in the spring of 1835, and there was no difference in the principle of the building of said car from the principle he has seen in use in the transportation of timber on the Baltimore and Ohio Railroad, and had he never seen a passenger car on Baltimore and Ohio Railroad, he would have been enabled to have constructed an eight-wheel passenger car.

The very close proximity of the wheels of which Mr. Winans speaks, had not suggested itself to Deponent's mind, and Deponent should probably have constructed the wheels of the trucks as far apart as the wheels of the ordinary four-wheel cars. At this early period, Deponent's idea was very crude, and he had not considered the details of the adaptation. At the time he constructed the eight-wheel cars, the road for which they were intended was a straight road, and it was not necessary to put the wheels close; but he placed them as far apart as his timber would permit, considering it an advantage to do so on a straight road; but at the time he built the cars in 1835, he did think that for curves of small radii, wheels close together would be better, and this opinion was founded on his knowledge of mechanics. Deponent had no knowledge of Mr. Winans' patent at the time of his (Deponent's) first construction of burthen cars for the Newcastle road.

THE TROY AND SCHENECTADY RAILROAD COMPANY *adsm.* ROSS WINANS.

Cross-interrogatories to James B. Dorsey, on the part of Ross Winans, the Plaintiff.

1 X. Do I understand you to say that the timber car was the same in principle and mode of operation as the eight-wheel passenger car now in general use throughout the country?

1st. To the first cross-interrogatory he answers: That its principle of action on the road is the same; Deponent's modification of the four-wheel passenger car now in use makes it better adapted to the passing of curves than the rude timber car spoken of.

2 X. Was the timber car a permanent structure, all the parts of which were arranged in reference one to another?

2d. Answers that it was not, but the ordinary platform car with bolsters put on it, for the occasion of carrying timber.

3 X. Did not the application of what you call the swiveling principle to the passenger car, require care, consideration and mechanical ingenuity and contrivance?

3d. Answers that it did require care, mechanical ingenuity and contrivance to make it permanent and lasting, while the other was only temporary.

4 X. Was nothing more required than was necessary to turn a temporary contrivance into a permanent structure—in the change from the two trucks carrying timber to the present eight-wheel passenger car?

4th. Answers that there was something more required; for the accommodation of passengers is very different from the accommodation of logs.

5 X. Was anything more necessary to carry passengers than to carry logs, except covered and convenient seats in a suitable body?

5th. To the 5th he answers that there was not.

6 X. Was anything more in fact done in converting the timber car into the present eight-wheel passenger car, than to provide a cover for the passengers with suitable seats in a proper car body?

6th. Answers that there was, and for the purpose of strengthening the parts and making it better adapted to sustain the body of the passenger car than was necessary for the purposes for which the car had been built; that is, the ordinary platform car.

7 X. Were not the trucks of the timber car united by a coupling, to prevent their separating under the timber?

7th. Answers that he presumes they were, from the nature of the case.

8 X. Are the trucks of the present eight-wheel car thus united?

8th. Answers that they are not, for the reason that the bolt goes through the body, and it did not go through the timber.

9 X. Was not the power applied to the truck in the timber car?

9th. Answers that it was.

10 X. Is it so applied in the eight-wheel passenger car?

10th. Answers that in some instances it is applied to the body, and in some instances the draft is to the truck.

11 X. Is it generally applied to the body or the truck?

11th. Answers that it is generally applied to the body.

12 X. Would not the connection of the trucks of a train of passenger cars, instead of the bodies, control the free action of the trucks in swiveling, and to that extent diminish the freedom of motion of the truck in passing short curves and turnouts, which is now one of the merits of the invention?

12th. Answers that it would, to a greater or less extent, according as mechanically applied.

13 X. What position did the trucks occupy in reference to the length of the timber in the timber car?

13th. Answers that they were placed, as well as his recollection serves him, so as to take an equal amount of the loads.

14 X. Do you mean to say that one half the weight of the timber was placed on each car?

14th. Answers that he does mean to say so.

13 X. (Repeated.)

13th. Repeated. Answers that he does not recollect.

15 X. If you do not recollect the position of the trucks, in reference to the length of the timber, how do you know whether their position was suited to the purposes of an eight-wheel car, or has been imitated in the eight-wheel cars now in general use in this country?

15th. Answers that he came to his conclusion from the fact of seeing a body of timber loaded on two cars, the timber resting on bolsters, turning an abrupt curve at high speed.

[Plaintiff's Attorney repeats the question.]

Ans. The particular position of the trucks Deponent does not recollect, but from its general position Deponent comes to the conclusion that it is similar to the eight-wheel car.

[Plaintiff's Attorney repeats the question.]

The witness answers by referring to his previous answers to this question.

16 X. Is the position of the trucks under a well constructed eight-wheel passenger car, a matter of indifference, or of thought and well considered adjustment?

16th. Answers that in their present state of perfection, they are accommodated well to the purposes intended.

[Question repeated.]

Ans. It is not a matter of indifference, but a matter of thought and well considered adjustment.

17 X. Is the distance apart of the wheels of the trucks of an eight-wheel car a matter of indifference, or a matter of thought and adjustment?

17th. Answers that they are a matter of thought, and should be so constructed as to accommodate themselves best to the road over which they are to pass.

18 X. Is not then the only similarity between the eight-wheel passenger car and the timber car, of which you have spoken, the swiveling the body on the trucks, with this difference, that in the passenger car the power is generally applied to the body, while in the timber car it was applied to the trucks?

18th. Answers that there is a difference in the construction of the two cars, and their greatest similarity is that they both work on a pivot or bolster.

19 X. Did you ever see an eight-wheel passenger car before you saw the Columbus on the Baltimore and Ohio Railroad in the winter or fall of 1831?

19th. Answers that he did not.

20 X. Did you ever communicate to Ross Winans the idea of an eight-wheel passenger car prior to your seeing the Columbus, as said to have been conceived by you in your examination in chief, when you saw the first timber car?

20th. Answers that he did not.

21 X. After the idea was suggested to you as stated, did you ever make a model of an eight-wheel passenger car, or take any step to give the idea thereof to the public, prior to the building of the car in 1835, on the Newcastle and Frenchtown Railroad?

21st. Answers that he did not, further than as before stated; that he made mention of his idea to persons whom he does not now recollect, and, to the best of his recollection, he mentioned his idea at the time he first observed a load of timber on two cars, passing round abrupt curves.

22 X. Do you consider the eight-wheeled passenger car a valuable and important acquisition to railroad machinery?

22d. Answers that he does; it is highly so.

23 X. Did you not find great difficulty in inducing your employers on the Newcastle and Frenchtown Railroad in 1835 to adopt it?

23d. Answers that he did; the difficulty was in the introduction of the eight-wheel car, but not of the passenger car.

24 X. Had not the employment of two trucks to carry long timber, become common on railroads in 1832, 1833 and 1834?

24th. Answers that it had.

25 X. How long was it, to the best of your recollection, before the eight-wheel car got into general use in the United States?

25th. Answers that it was not, until the year 1838.

26 X. Did not builders and Companies with the eight-wheel car on their road, still persist in building four-wheel passenger cars?

26th. Answers (question objected to) that he does not recollect.

27 X. Did you, or did you not, advise Ross Winans that it would be impolitic to throw difficulties in the way of the eight-wheel car, because people were so incredulous in regard to it; and did he not, in the conversation of which you have spoken in your examination in chief, tell you that he wanted the invention to come before the public, when his demands would be such that no one would object to them, to the best of your recollection?

27th. Answers that he did so advise said Winans. The balance of the interrogatory the witness answers in the affirmative.

Examined in chief by the Defendants' counsel.

1st additional interrogatory by Defendant's solicitor:

In your several answers to the Plaintiff's cross-interrogatories, you speak of the adaptation of the swivel principle to the four-wheel cars as not combining all the advantages of the present eight-wheel passenger car. State whether the receipts of the alterations to enable the principle to be applied successfully in its use and adaptation to a passenger car, was known to you, and did you mean that the principle had been changed in any manner?

1st. To the 1st additional interrogatory he answers: That cars having been made previous to his constructing them, was a mode consequent on it of strengthening the cars, but such mode would have suggested itself to him, or to any other mechanic.

2d additional interrogatory by Defendant's solicitor:

Having heard read the specification of Mr. Winans' patent, marked S. P., and what he claims to be his invention, is there anything new in the description of his invention for the construction of an eight-wheel passenger car, to produce the advantages in his application, unknown to you at the time of said application for a patent?

2d. Answers that he does not.

28th additional cross-interrogatory:

Do I understand you to say that when you saw the timber car, the

eight-wheel car described in Winans' specification presented itself to your mind at once, and you could forthwith have built the car so specified, had you been employed to do so, or was not your idea crude and imperfect?

28th. To the 28th cross-interrogatory he answers: That the idea of a passenger car occurred to him that a car could be so constructed as to accommodate passengers, but not matured in all its parts, but a crude general idea of a passenger car.

(Signed,)

JAS. B. DORSEY.

DEPOSITION OF ASA WHITNEY.

ASA WHITNEY, deposition for Defendant. I am a machinist, practically and theoretically, and have pursued that business for at least thirty years. I was in the service of the Mohawk and Hudson Railroad Company as machinist from February 1831, to the spring of 1836, and from July, 1837 to July, 1839. I was appointed Superintendent of said road early in May or April 1833, and continued so during the residue of the time I was in the service of the Company.

While I was machinist of that Company, I constructed a truck to be used under one of their locomotives; the first one I constructed was in the fall and winter of 1832 and 1833, and put in use on the 24th or some of the last days of May, 1833; the locomotive under which it was put we called the "John Bull." There was a truck in all respects similar to that under the John Bull, under a locomotive called the "Experiment," the engine and truck of this locomotive were made by the West Point Foundry Association for the Mohawk and Hudson Rail Company, and delivered to said Company the 1st of September, 1832, and put in use on said road early in September, 1832.

The Plaintiff's counsel objected to the evidence in due time relative to the truck made by the West Point Foundry Association, on the ground that no notice was given of such evidence.

The drawing marked by me "Defendants' Exhibit, No. 1, A. Taber," represents a side view of the truck and driving wheel of the locomotive Experiment, and the frame on which the engine rest, which is all that it represents connected with the truck. The "truck" we call a system of four wheels placed on two axles which are placed parallel with each other, and kept in that position by a frame work having boxes on which rests the load to be carried. That truck is kept in its relative position to the carriage resting on the truck, on which carriage is deposited the load to be moved by a centre-pin or king-bolt, otherwise called the transom bolt; the load rests on the two side pieces of the truck frames and not on the centre-pin, between which side pieces and the journals of the axle there are four springs, one for each journal of the axle. This describes the general features of the structure of the truck. This truck frame consists of two pieces running lengthwise of the truck from one axle to the other at the extremities of the axle, and may be outside or inside of the wheels, according as it has an outside or inside bearing; in this case it had an outside bearing.

These two side pieces are framed into two transverse pieces at their ends, constituting the ends of the frame; in one of these trucks there is

a piece running transversely from side to side across the centre between the two axles, and the other is made with a like piece running longitudinally from end to end of the frame at the centre between the wheels of the truck; the first above description of cross-piece was used in the truck under the Experiment and the other, that is the longitudinal one, on that under the "John Bull." The centre-pin in each of these trucks was at the intersection of lines drawn diagonally from centre to centre of the tread of the wheels; this would bring the centre-pin or bolt in the centre between the wheels of the truck and the axle of the truck. The upper end of the centre-pin or bolt was firmly fastened to the boiler of the Engine, which rested firmly on the upper frame and became a part of it.

The object of the centre-pin was to keep the carriage and load resting on it in the same relative positions laterally with the trucks. When the engine was running with the truck forward, the truck was left free to conform to the curvatures of the road by turning on the centre-pin; the lower end of the centre-pin was inserted in a socket made fast in the centre timber of the truck; the power to drive the truck resided in the engine attached to the upper carriage, consequently in moving forward the motion was communicated through the centre-pin to the truck, and the carriage was pushed forward, being driven from a power behind; in moving in the other direction the truck becomes the rear wheels, and is drawn instead of being pushed in the same manner. When the carriage is running in the last mentioned direction, the operation of the centre-pin is to enable the truck to turn the curve the same as if it was running in the other direction. In both the abovementioned engines there was a segment of a circle made of iron, attached to the upper side of the side timbers on each side of the truck; on each side of the upper frame there was what we would call a stand perhaps, made of cast-iron, which held the journals of a conical roller on each side, the load rested on these rollers which rolled back and forth as the truck run into a curve one way or the other on the segments of these circles, to prevent the rocking or promote steadiness. The truck as I have described it is composed of two pairs of wheels with the frames connecting them together. Under the engine "Experiment" the flanges of the forward and rear wheels of the truck were about twelve inches apart. I don't recollect precisely, but I see by the drawing "No. 1, A. Taber," that they are about twelve inches apart. Under the engine "John Bull," they were nearer together, not more than two or three or a few inches apart; at all events, they were nearer than in the other. I should think it would not require any inventive power to place the wheels nearer together or farther apart, *unless some new object was to be gained by it.* It would be an improvement if any means could be adopted to lessen the difficulty of passing a curve; the nearer the wheels are together the less that difficulty would be.

There is nothing new in the fact or principle that you can pass a curve more easily with the wheels near together than further apart; it has been known ever since I knew anything on the subject of railroads. In the first carriage that came out from England the wheels were as near together as they could be without touching.

The answer in the last sentence was objected to as not coming within the notice of defence in this cause.

The diameter of the wheels of the truck under the "Experiment" was thirty or thirty-two inches. The diameter of those under the "John Bull" were less; they were twenty-eight or thirty inches. The distance between the centre-pin of the truck, under the "Experiment," and the centre of the driving wheels, as appears by the abovementioned drawing, which is, I believe, correct, was eight feet eight inches.

Early in the spring and in March or April, 1832, southern pine rails for the second track were delivered on the first truck. These rails were from forty to sixty feet long. I think the longest were sixty feet at least. They were drawn on the road by the use of two common cars constructed for drawing materials. These cars were placed far enough apart so that each sustained half the burthen, and about thirty feet apart for a sixty foot stick. These cars thus laden did not exactly constitute an eight-wheel car, inasmuch as in turning a curve with cars loaded in this way, the timbers must slip on the cross timbers (on which it rested) or the cross timbers must slip on the cars; while in the eight-wheel car on two trucks, the truck traverses round the centre pin on two rollers, and the friction would be less in the latter case than in the former.

The cross timber last abovementioned was placed crosswise across the centre of each car. Before we made the trucks in the manner I have above described, we put a bolster on the cross timbers and fastened it with a centre-pin upon which we drew timber; it was a rude structure.

There was a truck similar to those under the John Bull and Experiment used under a locomotive on the Saratoga and Schenectady Railroad in June, 1833.

I passed over the road of the Defendants two years ago and noticed the cars; they were long eight-wheel cars.

They had four wheels at or near each end on two trucks. I think each four of these wheels were a truck which were similar in all essential points, and operated like those under the John Bull and Experiment.

Q 2. Could a mechanic capable of constructing a railroad car put two of these trucks under a car, one at each end, without exercising the faculty of invention?

Ans. I do not think the faculty of invention consists in repeating what has already been done, (that is, I mean invention does not consist in so repeating.) The trucks under the John Bull and Experiment were the same, except putting the two under instead of one; and to multiply by using two trucks instead of one, I do not consider invention.

Q 3. Would a good mechanic, acquainted with the principle of the running of cars upon a railroad which had curves in it, straight in some places and curved in others, know how to locate these trucks in the proper manner under a railroad car?

Ans. I think he would.

Cross-examined.

X Q 1. In answer to the question beginning with "could a mechanic (fol. 17) capable of constructing a railroad car," did you not say that it is difficult to tell what invention is?

Ans. Yes, I recollect saying so.

X Q 2. Did you ever see a railroad passenger car with the same arrangement of wheels taken collectively as you have described to have been used in the "John Bull" locomotive?

Ans. I have not.

X Q 3. Did you ever see a railroad passenger car with the same arrangement of wheels taken collectively that you have described to have been in the Experiment locomotive?

Ans. I have not.

X Q 4. Do you think such an arrangement of wheels would make a good passenger car?

Ans. Not as good as though there were two trucks under it.

X Q 5. When did you first see an eight-wheel passenger car with a permanent body, such (?) are now in use?

Ans. I cannot answer that question with precision, but think in the fall of 1834 or 1835, but cannot be certain.

X Q 6. Can you state where you first saw such a car?

Ans. In the fall of 1834 or 1835 I went from New York to Baltimore, and think I saw the first car of that kind on that trip.

X Q 7. Can you now state whether you travelled the entire distance by railroad, or whether you travelled a part of the way by coach or water?

Ans. I travelled from New York to Amboy by boat, then to Bordentown by railroad, thence to Newcastle by steamboat, thence to Frenchtown by railroad, thence to Baltimore by steamboat.

X Q 8. Can you state upon which [of the railroads referred to you saw the eight-wheel car referred to?

Ans. I cannot with precision, but think it was at Baltimore or Frenchtown on the Newcastle road.

X Q 9. When you say Baltimore or Frenchtown, do you mean to refer to the city of Baltimore as distinguished from the Frenchtown railroad?

Ans. Of course I do.

X Q 10. At the time you put the four-wheel truck under the John Bull, did you know or had you heard of the eight-wheel passenger car hereinbefore referred to?

Ans. I had not.

X Q 11. Up to the time that you put the four-wheel truck under the John Bull, had you any knowledge of an eight-wheel car for carrying passengers having been constructed for use on any road?

Ans. I had not.

X Q 12. Supposing that a car builder having experience in such business should have been shown the John Bull, and after having seen it been requested to build the best passenger car which his information up to that time would have enabled him to do, would he have built an eight-wheel car similar to those now in use?

Ans. I think a car builder having experience of the want of railroads, would have decided to build longer cars as all railroads now do, and in making longer cars I should suppose they would have put two trucks under them.

X Q 13. Do you mean to say that the only advantage of the trucks consists in the length of the car body?

Ans. No.

X Q 14. How long after the arrangement of the trucks under the John Bull was made did you continue as Superintendent of the M. and Hudson road?

Ans. Until the fall of 1839, except a year from May 1836 to 1837.

X Q 15. Can you now state when the first eight-wheel passenger cars were first put on the road?

Ans. They were not put on it until after I left it; the road was stocked in its early starting.

X Q 16. After the time you have stated at which the John Bull was arranged with the four-wheel trucks and before you left, were any passenger or freight cars procured or built by said Company?

Ans. They were; an additional number of cars were being built at the time of the alteration of the truck of the John Bull, and were put on in the spring and summer of 1833; there were other freight cars added afterwards.

X Q 17. Can you state how many were put on annually?

Ans. Between 1833, the commencement of the season, and the close of 1834, there were about 150 freight cars put on; this is according to my best recollection, and this number was kept good; we broke them occasionally.

X Q 18. Do you mean to be understood that between the close of the year 1834, and the time that you say you quit the service of the Company in 1839, that there were no new freight cars built?

Ans. I do not recollect of any; we may have broken cars and built others as substitutes for them, but I do not think there was an entirely new car built during that time.

X Q 19. Do you not know that during the period referred to, from 1834 to 1839, that more or less of the cars used for freight on that road were demolished by accidents on the road?

Ans. I do not recollect of a single one being demolished, the tops were broken, but the wheels, the running part, was preserved; the tops are a frailer structure.

X Q 20. Between 1834 and 1839 were any alterations made in the construction of the running gear of the cars referred to?

Ans. I think not.

X Q 21. Were any passenger cars procured or built between the opening of the season of 1833 and the time you left in 1839?

Ans. Yes.

X Q 22. How many and when in each year?

Ans. There were from sixteen to twenty-four put on during the season of 1833, or it might have been in the spring of 1834, and none after that.

X Q 23. You have said that you were away one year between 1834 and 1839. Were you engaged that year in railroad employment?

Ans. I was not.

X Q 24. Do you know whether previous to October, 1834, there were any eight-wheel passenger cars or burthen cars built substantially like the eight-wheel passenger and burthen cars now in use, operating on any railroad in the neighborhood where the John Bull locomotive was in use?

Ans. I do not.

On his *re-direct* examination the witness further testified :

Q. (?) Were all the passenger cars which you have mentioned as having been put on to the road in 1833 and 1834, contracted for in the winter of 1832 and 1833?

Ans. That is my impression.

Q 4. State the reason why those cars were not longer and with the trucks under them?

Ans. There were two inclined planes on that road, one at Albany and one at Schenectady; the distance between the angle of the plane and the place of attachment of the ropes that drew the cars up the plane, was too short to admit a long car, so that the rope could be detached from it after the hind end of the car left the inclined plane. That was altered in the winter or spring of 1835 and 1836 by removing the place of attachment of the stationary power further from the head of the plane.

On his further cross-examination this witness says :

X Q 5. (?) After the alteration that you have spoken of in the inclined plane, which would permit of the use of eight-wheel passenger and freight cars, how long was it before they were introduced?

Ans. Not until after I left, and I believe not until 1840.

X Q 6. Had the Company a shop for the construction of any and what kind of cars?

Ans. They had a shop to make their repairs and build their freight cars.

X Q 7. In your direct re-examination you have stated that the angle of the inclined plane would prevent the use of eight-wheel cars, and that during the years 1833 and 1834 there were 150 freight cars built in the Company's shops; do you mean to be understood as saying that the cars which were built were put on four wheels because the angle that you have spoken of would not permit of the use of eight-wheel cars?

Ans. I do not know that that was the only reason; for the business that these cars were used; four-wheel cars were as convenient as eight-wheel cars. There was no particular motive for change.

X Q 8. Was the motive that you refer to discussed as a motive to your knowledge?

Ans. When the cars were originally constructed it was not, because that was previous to the time of building these trucks, but subsequently and prior to the altering of the planes, that subject was discussed, and it was the motive for altering the plane that the long cars would come into use?

X Q 9. Was that subject discussed before you had seen or heard of an eight-wheel car?

Ans. I do not think it was.

X Q 10. Was not more or less of the four-wheel burthen cars you allude to, built after the John Bull was put on the road?

Ans. Yes.

(Signed,)

A. WHITNEY.

DEPOSITION OF JOHN B. JERVIS.

ROSS WINANS *Plff.* vs. THE SCHENECTADY AND TROY RAILROAD COMPANY *Defts.*

And the said JOHN B. JERVIS having been by me first cautioned and sworn to testify to the truth, the whole truth, and nothing but the truth, in the matter of controversy aforesaid, I did carefully examine the said John B. Jervis, and he did thereupon depose, testify, and say as follows, viz.: That he resides in the city of New York; that he is going out of the United States to England, and intends to leave about the first of May; that he is a Civil Engineer by profession, and has been engaged in that business about thirty years, and has been engaged during that time on Canals, Railroads and Water Works, and was engaged in railroads from 1828 to 1833, and from 1845 to the present time. I have been engaged almost exclusively in the construction of railroads. From 1828 to 1833, I was engaged in the Carbondale Railroad, the Mohawk and Hudson, the Schenectady and Saratoga Railroads, and since 1845 in the Erie and the Hudson River Railroads. I was Chief Engineer of the Carbondale, also of the Mohawk and Hudson, and Schenectady and Saratoga Railroads; they were run a few months before I left, and the Mohawk and Hudson over a year before my connection with it ceased; all the machinery, locomotives and cars were constructed under my direction previous to my leaving them. I was Chief Engineer of the Hudson River Railroad for about two years and a half, and since have been Consulting Engineer. I had charge of all the preliminary examinations of the Hudson River Railroad since 1845. I have paid a great deal attention, since I have been connected with railroads, to the construction of locomotives and cars. I have a good deal of knowledge of the principles upon which the running part of locomotives and cars which are now used and which have been in use since I have been engaged in my profession, have been constructed and used. My attention has been particularly directed to the subject of the arrangement of the wheels of locomotives and cars to facilitate the running of locomotives and cars on curves; my attention was very early directed to that subject. It was a subject on which I had often thought a good deal, but made no experiments until 1831. In 1831 and early in 1832, I was very much engaged in devising some means by which four wheels could be substituted for two as the leading wheels of the locomotive, and finally prepared a plan by which the forward end of a locomotive was supported by a sort of independent carriage consisting of four wheels. Those wheels were placed near to each other and working under the main frame of the engine which rested mainly on the outside timber on friction rollers, supported in its lateral position on the frame of the independent carriage by a centre pin, and this independent carriage being a substitute for the two wheels formerly used. The paper which is now produced and marked Exhibit A G W M is a copy of the original plan of which I have spoken. I have compared it with the original plan and find it to be a correct copy; the Exhibit is annexed to this deposition. A locomotive was made on that plan under my direction by the West Point Foundry Association in 1832. I think it was called the Experiment. The locomotive was put on the Mohawk and Hudson Railroad in the autumn of 1832.

The engine was run for a sufficient time to test the independent carriage. The boiler was arranged to burn coal, but as it did not operate well, the engine was taken off. I then made a new plan for an engine for the Schenectady and Saratoga Railroad Company, with the same arrangement for the independent carriage or truck with four wheels to support the forward part of the engine. This engine differed from the first by having the boiler constructed to burn wood; the engine was constructed on this plan and put on the Schenectady and Saratoga Railroad, I think in June, 1833. It worked with complete success. It was called the David Crockett, I think. The independent carriage or truck under the two engines spoken of were made substantially according to the plan represented on Exhibit A. I do not recollect any difference; if there was any, it was of some trifling nature. Exhibit A represents the plan on which the independent carriages of both engines were made. The Mohawk and Hudson Railroad Company had a locomotive called the John Bull; this engine was placed on four wheels, and in that way ran nearly the whole of the year 1832; in the winter of 1832 and '33, the forward wheels were taken out and four wheels on an independent carriage similar to that in Exhibit A were put under the forward end of the locomotive as a substitute for the two wheels; after this alteration she was put on the road early in the season of 1833, I think May or June, and has been run with this independent carriage ever since. Exhibit A represents a side view of the truck, with a general view of the engine. The truck had two axles placed four feet apart; that distance might be varied so as to make the distance between the axles from three to four feet, and the axles were parallel with each other in a rigid frame, and kept in that position by a timber frame composed of side and cross pieces, provided with ordinary seats and journals. This frame bore the car or weight to be carried. The independent carriage is sometimes called the bearing carriage, but more generally the truck; that is kept in its proper position by a centre-pin, by which the independent carriage is free to swivel or turn in passing curves. The centre-pin or bolt is secured to the upper frame of the car, and passes into a socket in the frame of the independent carriage or truck; this socket or hole is placed exactly in the centre of the independent carriage. The car or weight carried by the independent carriage rests mainly upon side timbers of the independent carriage which have friction rollers on the centre of them. There are steel springs that take the bearing of the weight at all the journals. The side timbers of the truck which run lengthwise, can be placed on the outside or inside of the wheels according as you have outside or inside bearings; the side timbers and cross timbers are framed together. There must be timbers in the centre running across the frame from side to side, or end to end; they are usually run from side to side; my impression is, that the timbers in the Experiment were from side to side; the socket that receives the centre pin is in those cross timbers. The friction roller rolled on a surface of iron on the bearing carriage.

The power to move the truck backwards or forward was communicated through the centre-pin. There were several objects that were designed to be secured by this independent carriage or truck; one was, the number of wheels being increased, the load remaining the same, there was greater safety and less severity on the road; another, it

allowed the frame of the engine to be supported near the ends, without any objection arising to that arrangement, which would exist if the main carriage rested on four wheels, two at each end. Another reason, which is partly incorporated in the last, that it carried the whole machinery more steady than could be done by the old arrangement, giving, as a combined action, a long frame, at the same time securing the best possible arrangement for turning curves, and by increasing the wheels without increasing the load, giving greater security against accident, and greater ease in its action upon the road. The wheels and axles as adjusted in my truck, enabled the body carried to run more smoothly and safely on the road, than it could be made to run upon wheels in the old manner of four-wheel cars as formerly constructed, and this most particularly on the curves of the road.

The two wheels on either side of the truck constructed by me, from their proximity in carrying the car, acted like a single wheel, and attained the advantage which results from having the two axles of a four-wheel car near each end of the car, while its inconveniences were avoided.

I have read the printed specification connected with Mr. Winans' patent, and have examined the drawing annexed to the printed specification. The bearing carriage, which is described in the specification and exhibited by the drawing, is substantially the same as the bearing carriages I used under the locomotives I have spoken of. It is the same in respect to all the substantial principles of construction which were adopted by me in the construction of my bearing carriage. The variance, if any, does not affect the principle of the construction.

I have examined the specification and drawing with care, and in my opinion the placing of two of the trucks described in Mr. Winans' specification under a car, is nothing more than duplicating my truck. The influence of the arrangement of placing wheels together or far apart in a four-wheel car, in regard to steadiness of action or facility in turning curves, was well understood before the adoption of the trucks in 1832.

The weight of the body to be carried on my truck could be placed by the constructor principally on either the centre of the truck or side of the truck. All the cars which I have observed having two trucks with four wheels each, have had trucks constructed on the same principle as I constructed my trucks.

The specification and drawing describing Winans' patent, are annexed and marked Exhibit, B G H M, and referred to by the witness.

JOHN B. JERVIS.

Read to and subscribed by the witness, John B. Jervis, on his examination before me, this sixth day of March, 1850.

GEO. W. MORTON, *U. S. Com'r.*

DEPOSITION OF ELIJAH P. WILLIAMS.

ELIJAH P. WILLIAMS was then called by Defendants as a witness and testified as follows :

I was acquainted with the locomotive engines on the Mohawk and Hudson Railroad in 1832. John B. Jervis was then Chief Engineer. The Experiment was on the road at that time, also the John Bull. I think the John Bull was on first. The Experiment was constructed with a four-wheel bearing truck under the fore end, and a pair of driving wheels on the hind end. The tread of the truck wheels must have been twelve or fifteen inches apart. The truck vibrated with a swivel motion, with a bolster and centre-pin. When the John Bull came out from England, she was constructed as a four-wheel driving carriage. The trucks of the Experiment were built at West Point; her running gear worked well; there was some defect in her; she began to run early in 1832. The John Bull was imported in 1831; the truck was first under her in the winter of 1832-3; the truck was made at the head of the inclined plane near Schenectady; she was put at work on the road early in the spring of 1833. The Davy Crockett, with a similar truck, was put on the Saratoga and Schenectady Railroad in the summer of 1833. That was an English engine, and the trucks were made to order in England; it was like the other trucks. Those trucks and others like them, are still in use on those railroads. The trucks are substantially like those described in Mr. Jervis' deposition, and which were made by him in 1832. I have been engaged on railroads since 1829, and am now Superintendent of the Auburn and Syracuse Railroad, and have been since 1840. I am acquainted with the locomotives and cars in use on the railroads between Buffalo and Troy and Albany. I was acquainted with the Mohawk and Hudson Railroad while it was being constructed. I saw cars used on this road for hauling timber in 1832. Some of those cars were constructed with two rubble cars which had inside bearings and a frame about twelve feet long, consisting of side pieces and a cross timber at each end; the end pieces formed the upper bolsters. It was drawn by the truck frame. An eight-wheel car resting on a centre-pin could not be run with safety on our road at the speed we now run, without side bearings, which should be placed at the ends of the bolsters. The side bearings in use are various: Elastic Springs, India Rubber, Friction Rollers, and Sliding Bearings. In 1843 and in 1844, there were some eight-wheel passenger cars on the Auburn and Rochester Railroad, made in Cambridge, Massachusetts, which had no side bearings. They did not operate well until they were altered and furnished with side bearings. Those cars rocked when in motion, so as to make them disagreeable, as was supposed, and dangerous to passengers to travel in them, which defect was remedied by furnishing them with side bearings.

On *cross-examination* the witness testified as follows: The inclined planes on the Mohawk and Hudson Railroad were dispensed with in 1845. I think twelve or fifteen four-wheel cars passed in a train on that road, four or five of which were taken up and down the inclined plane at a time; the short cars were in three apartments, each of the apartments were five feet eight inches in the clear; the ends of the

cars projected nine inches each; the cars were connected at first very close, and afterwards by links. The spiral spring connection was used from about the year 1840, until the short cars were discontinued. I think it is not yet agreed what is the best method of connecting cars in a train. We use India rubber springs and elliptic springs over the journals. India rubber springs over journals are best. Cars cannot be used with safety without side bearings. Smooth even plates make good side bearings. I don't think the contact of the bolsters for a foot or more each side of the king-bolt a sufficient bearing; bearings at the ends of the bolsters are safest and best.

I think the timber cars on the Mohawk and Hudson Railroad had wheels thirty-six inches in diameter; some had platforms; the axles were about five feet apart; the cars were about twelve feet long. We made use of old dirt and stone cars. The cars were connected by a frame at the centres of the body of the rubble cars; the frame extended to the bolster. I am not able to say whether the end of the frame which constituted the upper bolster, rested its whole length on the lower bolster or not. The curves on the Mohawk and Hudson road were large curves, but the switch could not have been passed without the swivel arrangement. Trucks with axles five feet apart are now preferred to those nearer; there is not so much concussion. I think the elevation of the outer rail on curves is of no benefit; we dispense with it on our road, although it is the general practice on roads of short curves to elevate the outer rail; the extent of elevation is three inches; when the outer rail is raised, the line of gravitation is inside of the king-bolt. The bearing shown by the Plaintiff's drawing would do at twenty miles an hour.

From Plaintiff's drawing I should doubt whether it was intended to represent side bearings or not; eight-wheeled cars are used on the road of which I am Superintendent. I am a stockholder in that road.

DEPOSITION OF ISAAC ADAMS.

ISAAC ADAMS was called as a witness by the Defendants, and testified as follows: I reside in Boston; my profession and occupation is that of a machinist. I have pursued that occupation about twenty-five years. I am practically and theoretically acquainted with machinery and with the science of mechanics generally. I have carefully examined the Plaintiff's specification. I have examined the specification of Chapman's patent in the "Twenty-fourth Volume of the Repertory of Arts, Manufactories, and Agriculture, Second Series, printed in London in the year 1814," and the plates of drawings therein. It describes a truck substantially like the Plaintiff's; it embraces all the principles contained in Winans' specification, and it also represents side bearings, viz., friction rollers, which are not found in Winans' specification. The specification and drawing of Chapman's patent describe and represent two trucks connected with a carriage or body, and embracing all the principles or mechanical contrivance in Winans' specification; although the drawing or figure represents but one truck of four wheels, and another single pair of fixed wheels, it describes the method of substituting another truck of four wheels for the pair of fixed wheels, so

that the whole eight wheels will arrange themselves to curves when necessary to be used on curved roads. I have also examined the description in "Wood's Practical Treatise on Railroads, printed in London in the year 1825," and the plates referred to in the description, (to be found at pages 154-157, and the plate between pages 294 and 295); it describes and represents an eight-wheel carriage running on two pair of wheel trucks, with a swiveling or king-bolt connection. The principles of a carriage built according to Winans' specification are all developed in the description and drawing in Wood's treatise, though the manner of applying the motive power is different from Winans'.

The wheels in this drawing are driven by cogs. In the drawing in the "Repertory," they are drawn by a long chain running along the road and wound around a barrel.

The drawing and description show precisely how a long carriage with eight wheels, arranged to turn curves, can be constructed. I was present when Mr. Asa Whitney was examined, and heard his description of the trucks for the locomotive called the Experiment and also of the John Bull. So far as the principle or mode of action is developed, those trucks contained all that Winans claims in his specification, and in addition thereto certain side bearings, viz: friction rollers. If you would make a long carriage with two such trucks, all that would be necessary would be to duplicate the trucks, which would require no invention.

[A model intended to represent the bolsters in Plaintiff's drawing was shown to the witness.]

I think the model is a fair representation of the two bolsters shown in Plaintiff's drawing. I am of opinion a car made in that way would not be safe at the present rate of speed. I think to make it safe there should be side bearings, and the bolsters be so connected that they could not separate. I think the drawing of the car Columbus embodies the invention described in Winans' specification. I am acquainted with the eight-wheel cars in use on other roads. The main principles developed in eight-wheel cars now in use, are substantially the same as in the drawing of the Columbus, I mean exclusive of bearings and mode of attachment of the cars to the motive power and to other cars. I heard Mr. Williams testify respecting the timber cars used on the Mohawk and Hudson Railroad in 1832. I understood him to say that two trucks of four wheels each, were placed under a frame which was connected with trucks by a king-bolt. I think all the principles of the arrangement of the eight wheels and connection with the car body, are developed in the timber cars described by Mr. Williams.

The witness on *cross-examination*, testified as follows:

I am not a railroad engineer. I have been engaged in constructing portions of cars and locomotives; the mode of connection in the specification in which I include the drawing and that of the Columbus differ. In the drawing of the Columbus, the point of traction is by the truck, in Plaintiff's specification from the car body; the connection of the motive power to the truck would modify its action. Proportionally the trucks are farther apart, and the wheels are nearer together in the drawing attached to Plaintiff's patent, than in the drawing of the Columbus. In the timber cars described by Mr. Winans, I understand that the motive power was attached to the trucks.

I can discover no new mechanical action in duplicating the trucks and connecting them to four and eight-wheel carriages. When the first truck comes on a curve, the body turns on the second truck. The body does not turn on the driving wheels of a locomotive; when the first truck strikes the curve it changes its direction by swiveling. At that time the hinder truck keeps on the straight track, and the body swivels on it. If, by an addition, a new principle or new mode of action is developed, there may be invention. I think the description to which I have been referred in Wood's treatise, does not describe side bearings. In Plaintiff's specification nothing is said of side-bearings, and none are indicated. I think the machine described in Wood's treatise was a good one in reference to the time when it was got up, although I would not construct such an one. The free play of the trucks in the locomotive described by Wood would be retarded by the action of the cogs. I see nothing in Chapman's specification of a near arrangement of the wheels and a distant arrangement of the trucks. His wheels are all equidistant from each other.

On *re-direct* examination, the witness testified as follows :

I think any person qualified to construct railroad trucks would know that by placing the wheels of a truck near together, the truck would more readily turn curves. I could not tell the exact distance [that would be best, but think the placing the wheels on the four corners of a square would be the best arrangement. When I say that I would not now construct such a machine as is represented in Wood's treatise, I mean I would leave off the cog-wheels, and substitute a steam engine of the present construction, or nearly so. But the trucks and connection might be retained, and a pair of driving wheels put between them. I should make no alteration in the principle of the truck or its connection with the locomotive carriage. Or one truck might be left off, and a pair of driving wheels substituted. In my direct examination I mean to say that the invention claimed by the Plaintiff is embodied in the drawing of the Columbus, and in coming to this result I took the drawing into consideration and examined it in common with the specification, but I did not consider the mode of attachment as part of the claim, and I consider the drawing of the Columbus as embracing all in the claim. I cannot tell from the drawing why the Columbus failed. The plan looks as if there were no side-bearings. If turning curves were alone to be considered, I would attach the motive power to the trucks; but the objection in a train of cars would be the strain on the king-bolt of the forward cars. The wheels in Chapman's engine are all driving wheels. The principle of the machine described and represented in Wood's treatise, is not affected by the character of the motive power; the principle is the same whether cog-wheels, horses or steam is the power.

DEPOSITION OF EDWARD S. RENWICK.

EDWARD S. RENWICK, a witness called by the Defendants, testified as follows :

I reside in the city of Washington. I am agent in soliciting patents for inventors. I am acquainted with mechanics, practically and theo-

retically, and with the construction of many kinds of machinery, and have been for above ten years, and was educated for those purposes. I am acquainted with civil engineering. I have examined the specifications and drawing of Chapman's patent, in the 24th volume of the Repertory of Arts, published in London in 1814, and am acquainted with the Plaintiff's specification. The eight-wheel carriage described in Chapman's specification and drawing embraces all that the Plaintiff claims in his patent. I have also examined the description and drawing of the eight-wheel carriage in Wood's treatise, as there shown in connection with the motive power and running gear. It contains all that is claimed by the Plaintiff in his specification.

I have heard read the deposition of John B. Jervis, describing the truck constructed by him for the locomotive "Experiment," and have also heard read Mr. Asa Whitney's deposition in relation to the same and similar trucks.

Those trucks contain every thing described in the Plaintiff's specification in the construction of the four-wheel truck. It would require no invention to place two such trucks at each end of a locomotive or car, any more than it would, after having a shoe made for one foot, to make another shoe for the other foot. Such a timber car as Mr. Williams describes, I think contains all the arrangement and connection claimed by the Plaintiff on his patent. The drawing of the Columbus contains the whole arrangement and connection of the eight wheels to the car body claimed in the Plaintiff's patent.

In examining the Plaintiff's specification, I took in connection all parts of the drawing relating to the parts claimed in Plaintiff's specification as his invention. I consider every thing in the drawing as tending to illustrate and explain the invention. But many things are shown in the drawing which are not claimed by the Plaintiff as his invention. The brake, mode of attachment, locks and fastenings, although represented in the drawing, are not mentioned in the specification, and I consider make no part of his invention. I am acquainted with the eight-wheel cars now in use on various railroads.

I think an eight-wheel car constructed without side-bearings would not be safe to run at the rate of speed now usual. Some persons might think it safe to go down Niagara Falls, but I should not.

The bolsters, as represented in Plaintiff's drawing and illustrated in the small model, [shown to the witness] would not be safe without side bearings.

The witness, being *cross-examined*, testified as follows:

It is, I think, obvious that side bearings are necessary to prevent swaying. If bolsters came in contact for half the distance between king-bolt and ends, it would not be safe to dispense with bearings in turning curves at a speed of twenty miles an hour. I have seen no cars in use without sway bearings. The distance of the bearings from the centre would be an obvious thing to a good mechanic. It is an advantage to allow the wheels to adapt themselves to slight irregularities in the road. I can't say whether I ever saw the body of a car carried off of its running gear by its centrifugal force. I have been a Solicitor of Patents fifteen months; I have engineered on railroads, but have not been a Railroad Engineer. I have had half a mile of railroad under my charge at the Wyoming Iron Works in Pennsylvania. We had eight-

wheeled burthen cars, but no eight-wheeled passenger cars. I consider it an invention to turn a shoe into a boot, because it won't require tying, and will protect the leg.

DEPOSITION OF WM. F. HUDSON.

WILLIAM F. HUDSON, a witness called by the Defendants, testified as follows :

I reside at Buffalo; am Superintendent of the motive power on the Buffalo and Attica Railroad; I have been there a year; I was for nine years personally engaged in constructing locomotives at Auburn; I am a machinist; I have examined Chapman's specification and drawing in the 24th volume of last series in the Repertory of Arts, &c. I have also examined the specification of Plaintiff's patent and the drawing; I think Chapman's specification contains all the arrangement and connection of the eight wheels with the body claimed in the Plaintiff's patent. I have examined the description and drawing of the eight-wheel locomotive carriage contained in Wood's treatise. That contains all the arrangement and mode of connection of the eight wheels with the car body claimed by the Plaintiff. I heard Mr. Williams testify, and heard his description of the timber cars used on the Mohawk and Hudson Railroad. That car contained all that is claimed in the Plaintiff's specification. A long eight-wheel car would not be safe for passengers without side bearings at the end of the bolsters, or some other adequate device, to prevent the car swaying. The drawing of the Columbus delineates all that is claimed by the Plaintiff in his specification as his invention; and the drawing of the Columbus represents all that is essential in the cars now in use on the railroads, except the springs and side bearings and the manner of attaching the car to the tractile power and to other cars in the train. In examining Mr. Winans' specification, I took into consideration the drawing now attached to the printed copy shown to me, (which is admitted to be correct). There are portions of the drawing that do not represent any part of the things claimed by the Plaintiff, such as the springs, brakes and other things. I find the parts as claimed in the specification all in the drawing. Nothing is said in the specification respecting the mode of attachment, nor is there any mention or indication of side bearings in the specification or the drawing.

I think it is represented by the drawing that the centre-pin alone was intended to control the oscillation of the car. The end iron I think confirms this.

Being cross-examined, the witness testified as follows : The Railroad Company in which I am employed uses the eight-wheel cars, and pays me for my services.

DEPOSITION OF HARVEY WATERS.

HARVEY WATERS, a witness called by the Defendants, testified as follows :

I reside in Birmingham, Connecticut, eight or nine miles from New

Haven. I am a machinist; am acquainted with the science of mechanics, have followed the business since I was seventeen years old. I have examined the description of Chapman's eight-wheel locomotive carriage in the 24th volume of the Repertory of Arts, last series, (the same spoken of by the other witness.) I have examined the Plaintiff's specification. I think Chapman's eight-wheel carriage, as described in the Repertory of Arts, contains all the principles and subject matter of the Plaintiff's specification. I have also examined the locomotive carriage described in Wood's treatise, and that I think contains the subject matter of Plaintiff's patent. I heard Williams testify, and his description of timber carriage used in 1832; that also contained the invention claimed in Winans' patent. I heard the deposition of Mr. Asa Whitney and his description of the single trucks under the locomotives.

I think it a nice question whether the one truck contains the whole of Winans' invention. I incline to the opinion that it does contain the whole subject matter.

The Defendants rested, and the Plaintiff gave the following testimony in reply :

DEPOSITION OF MICHAEL M. GLENN.

MICHAEL M. GLENN recalled, testified as follows : I find in Plaintiff's drawing a sufficient representation of a bearing surface to prevent the sway of the cars. I have seen a great many cars with the bolsters as represented in the drawing, 500 or 600. I deem it important that motive power should be attached to the body in order that it may have free motion on the curves; the extent of the bearing of the bolster as the cars were built, was eight or ten inches from the centre on each side; the cars I speak of were freight cars; some passenger cars were constructed like this, and some different. The Washington cars were made with friction rollers on the end of the bolsters. The play between the bolsters was three-eighths of an inch; the drawing represents a burthen car. I think a friction roller is a common device. I never heard Mr. Gatch lay claim to the invention of an eight-wheel car. Mr. Winans' claim to the invention was a matter of notoriety about the shops.

On *cross-examination*, the witness testified as follows : I cannot tell the extent of bearing shown in the Plaintiff's drawing. The cars I spoke of were built with bearings as shown in that drawing. There was in them eight to ten inches bearing on each side of the centre. There were 300 or 400 cars like that built before I left the road. I left the road in 1840 or 1841. The Washington cars had friction rollers. I don't know whether the Columbus, Winchester, Comet and Dromedary had friction rollers. Those four cars were on the road more or less until the Washington cars were built.

On *re-examination* by Plaintiff the witness added, that although those cars were running, they were not considered successful; the Company did not like them.

DEPOSITION OF WASHINGTON O. FROST.

WASHINGTON O. FROST, recalled by Plaintiff, testified as follows : The drawing of Plaintiff represents a freight car. I have seen cars on the Baltimore and Ohio Railroad built in accordance with the drawing. I believe they were successful ; they used them, do still some ; the bolsters had a bearing from the centre-pin, eleven inches on each side. I never heard Conduce Gatch claim the invention ; it was generally said Winans was the inventor.

The witness being *cross-examined*, testified as follows : I think the drawing represents the extent of bearing to be about sixteen inches each side of the centre ; the upper bolster is represented to be about eight inches longer than the lower bolster. I left the Baltimore and Ohio road in 1833 ; I saw an eight-wheel freight car running on the road before I left ; the car was employed in carrying freight on the road. The car was constructed something like the Columbus. I think the wheels were nearer together than those of the Columbus. The Columbus run a few trips before I left the road. I went back the next year on a visit and saw an eight-wheel car running on the road.

DEPOSITION OF WILLIAM H. HIBBARD.

WILLIAM H. HIBBARD, called by the Plaintiff, testified as follows : I reside in Boston ; my present business is that of Mechanical Engineer ; I have from my youth followed mechanical pursuits ; was for eight or nine years a draftsman in an engine shop in Boston ; have paid some attention to the construction of railroad machinery ; I understand the laws of mechanics and the laws of mechanical action ; I have examined a printed copy of Plaintiff's specification. In all inventions some purpose is to be accomplished. The object stated in this specification is to acquire stability and diminish the friction which arises from the rubbing of the flanges against the rail, and the cause of this is, that in turning curves the axles do not coincide with the radii of the curve, consequently the flanges act obliquely upon the road. The nearer the axles are to each other the less will be the angle which the flanges make with the rail, but if the load were placed on two axles very near together, it would want stability.

That difficulty is avoided by placing a truck at each end of a long body, thus combining both advantages of near and distant arrangement of the wheels ; and the trucks are left at liberty to conform to the curves of the rail as far as is consistent with supporting the body. This is effected by the swiveling motion ; the active agent in producing the swiveling motion is the rails of the road.

I think it appears from the end view in Plaintiff's drawing, that the coupling the cars in a train or to the motive power, is by a bolt at the end of the platform. I conceive it necessary to the free action of the truck that the connection should not be with the truck. When the old four-wheel car passed over an obstruction of half an inch, it would raise the end of the body one inch. In the eight-wheel car the bearing between the axles would be raised but one-fourth of an inch, in the for-

mer the middle of the car would be raised a quarter of an inch, and in the latter an eighth of an inch; in the old car, the end would be depressed; in the eight-wheeled car it would not be affected; connecting cars by the truck would have a tendency to cause the truck to swerve from the direction of the rails, to the amount that it is drawn out of the direction in which the track tends to make it run. When the rear truck of the forward car enters the curve it carries the point of connection with the next car towards the outer rail, which has a tendency to throw the first wheels of the forward truck of the next car against the outer rail, and give them a diagonal action. It has the same effect on the rear wheels of the rear truck of the forward car; when the bodies are linked together instead of the trucks the tendency would be to press the whole truck, both fore and hind wheels, against the outer rail. When the attachment is to the body, it leaves the truck free to adapt itself to the curve.

The drawing of the Columbus differs from that of the Plaintiff in the attachment of the trucks to the motive power; the wheels of the trucks are not proportionally as near, nor the trucks as far apart as in Plaintiff's drawing. There is a perch to which the motive power is attached and draws by the trucks; the principle developed in the plan of the Columbus is inferior to that described in Plaintiff's patent and represented in the drawing.

[A model of Morris' car was shown to the witness.]

The Morris car has some points of resemblance to Plaintiff's; it has eight wheels; it has a provision for surmounting vertical curves, but none for turning lateral curves. I consider the difference between Morris' and Winans' cars important and substantial. I think it would require invention to adapt Morris' cars to passing lateral curves.

[A model of a timber car being shown,] the witness says: In the use of the timber car made up of two platform cars, with bolsters on them and connected by a perch below, in turning a curve the ends of the timbers must slip; the reason is, that the chord of the curve is shorter than the arc. I consider two platform cars so arranged to carry timber as a fortuitous, accidental contrivance, and not an organized machine as a whole. If, instead of the timber, a body of a car should be placed on them, the trucks being coupled together by a perch, one of the timbers would have to slide under the body at every curve. If the perch were removed, and the motive power were applied to the truck, it would resemble the Columbus in that respect.

[The drawing of the carriage of the Experiment, by M. Jervis, being shown to him,] he says:

I do not find in this drawing the whole principle contained in Winans' specification and drawing. I find what is similar to one of the trucks described in Plaintiff's patent; that is, a truck of four-wheels with a provision for turning curves, except that the wheels are further apart.

The witness was then asked whether Jervis' plan would suggest the plan of Plaintiff's eight-wheel car, to which he answered: I can hardly answer that question; it would depend upon the mind of the person to whom the plan was shown. I consider the difference between that and Ross Winans' patent, as substantial and important, and one which requires invention. The driving wheels at the hind end, as combined in

the carriage of the Experiment, would not have the same mechanical action as the two trucks in Winans' patent.

It is an object to get weight on the driving wheels and get adhesion. The adhesion of the driving wheels on the rail will resist the action of the forward truck in passing into a curve to the amount of that adhesion; when the truck of the locomotive passes on the curve, one or the other of the driving wheels must slip on the rails. If in the locomotive, instead of the two driving wheels, you had a pair of running wheels without any adaptation of them to turn the curves, the mechanical action of such running wheels would be the same as that of the driving wheels, though less in degree; there would be difference in the adhesion of the wheels to the rails. The driving wheels of locomotives are generally larger than the running wheels.

I have read the specification of "Chapman's Patent in the 24th volume of the Repertory of Arts;" this patent was for a machine for the purpose of drawing coal wagons on tram roads near coal mines. It describes several plans. The tram roads were made with flat bars with a ledge or flanch on the edge; the wheels were without flanches, and ran within the ledges of the road, and could run on common roads. The engine was drawn by a chain which wound round a drum and was stretched along the road resting upon forks in the centre of the truck, and by the revolution of the drum or barrel, the chain was wound up and the locomotive driven.

Those tram roads were frail and were often broken by the weight of the engine, which Mr. Chapman designed to prevent by the use of six and eight wheels so as to divide the weight. When six wheels were used, the truck was placed under one end of the engine and two rigid wheels at the other end; it speaks also of using, when necessary, two trucks of four wheels each.

There is in Chapman's specification, nothing about dividing the weight in running carriages. The object of the patent seems to have been to provide a locomotive with the motive power described. There is no drawing in Chapman's patent which represents the application of eight wheels. The drawing shows six wheels. The pair of wheels with a fixed axle are forward of the truck in Chapman's. I do not find in Chapman's description, a forward truck as a means of adaptation to the road. Taking the whole of Chapman's specification and drawing, I find Chapman's engine very different from Winans' invention. It was devised for a different purpose entirely. The principal object in Chapman's engine was to distribute the weight, and, as an incident, to allow the six wheels to conform to the curves. The drawing does not show the principle of adaptation to the curve by a forward truck. I find in Chapman's nothing of the reasoning that is found in Winans' specification. There is nothing in Chapman's that looks to bringing the axles near to each other and the trucks far apart. The opposite seems to be the idea, viz: to distribute the weight.

I regard Winans' invention as substantially different from Chapman's. Chapman's patent has no reference to running carriages. Taking Chapman's entire description and drawing, in my judgment, a locomotive to be impelled as therein described, could not be made practically useful. It would be utterly incapable of meeting the wants of a railroad now.

The specification bears date December, 1812.

I have read in Wood's treatise (now handed to witness) on railroads, printed in 1825, a description of a locomotive engine with eight wheels, and a drawing. The driving wheels are all moved by cogs; there is provision for turning lateral curves; The locomotive is sustained on two trucks. The driving wheels of each truck are geared together with cog wheels, and the front axle of the rear truck and the rear axle of the front truck are geared together by an intermediate cog. This intermediate cog will have a tendency to restrain considerably the free play of the trucks—to raise one end of one truck and depress the other end of the other. If the whole power of the engine is applied to turn the centre cog wheel, mashing into the cogs of the nearest axles of the trucks, it would not be practicable to connect the trucks with the body merely by king-bolts; it would be a failure on the face of it. I think it would be difficult to keep it on the track at all. I think it would be lifted and set outside of the rail. I think the gearing would not act perfectly with the swiveling principle; one or the other must be subordinate. The principle of a free swiveling is directly opposite to what is required for cog gearing. In the engine in Wood, the trucks must be near together, because you cannot have an intermediate cog beyond a certain size. I find no intimation in the description of the engine in Wood, that it is to be used for a running carriage.

I find in the engine in Wood and on Winans' car, eight wheels arranged on two trucks, and the two trucks attached to the frame by swiveling joints. Mr. Winans' car differs from the engine in having a near arrangement of the axles of each truck, and a remote coupling of the two trucks, and in drawing by the body instead of the trucks. In the engine the wheels propel the carriage, and in Winans' the carriage propels the wheels. In the engine the wheels are primary; in Winan's they are subordinate. In the engine part of the load is put on the trucks and part on the bolsters; in Winans' all the load is on the bolsters. In the engine the bolsters must be high, so that the cogs may not interfere with the king-bolts; higher than Winan's car.

On *cross-examination* the witness testified as follows:

Winans' specification directs the wheels of each truck to be placed as near together as convenient, but does not state at what distance apart the two trucks should be placed. The direction is to place them near the ends of the car far apart, a considerable distance apart. He also states that in form the bearing carriages may be beyond the end of the car. The mode of connection is by a bolster like that of a wagon and king-bolt. There is nothing else claimed in Winans' patent, except this arrangement of wheels and carriages and their connection with the car.

The distance of the two trucks apart must be regulated by the length of the car body. I find in Chapman's patent an intelligible description of a truck of four wheels connected to the body by a king-bolt so that it will swivel.

The truck of Chapman's differs from Winans' truck in the relative distance the wheels are apart in proportion to the length of the truck frame, and in the provision for sustaining the load placed upon them. In Chapman's engine, there is a circular railway on the top of the truck frame, on which are conical rollers, if I recollect, placed on

which the load is borne. Winans' truck has no side timbers; the spring takes the place of those. His drawing shows an outside timber, and a spring over each journal. In Chapman's truck the timber is inside of the wheels. In Chapman's there is an inside bearing, and in Winans' an outside bearing. Chapman's drawing shows wheels with a flat tread. The description speaks of ledges on the wheels. I see no other important difference between Chapman's engine and Winans' car except in form and general appearance. The description in Chapman's indicates that another bearing carriage may be substituted for the pair of wheels. There is no circular way or rollers described in Winans' patent.

In the drawing of Chapman, the truck is behind, and the pair of driving wheels with a fixed axle is ahead; in the drawing of the Experiment, the truck is ahead and the driving wheels behind. I think there is a difference in mechanical action between Chapman's engine and Winans' car. The single pair of driving wheels restrains the action of the truck; the one truck requires another truck with a joint, in order to have a free action.

[A model being shown to the witness, he says:]

This model represents parts found in Wood's drawing. Taking the locomotive in Wood's, and taking off the cog wheels and boiler and all the driving part and putting on a body, there is then a difference between Winans' car and the engine in Wood's in the relation of the parts of the running gear to the body.

I find in the treatise and drawing the two trucks are connected with the frame or body by bolsters and king-bolts as in the model. By divesting the carriage described and represented in Wood's treatise of the cog wheels and apparatus, the obstacle to the free motion of the trucks would be removed. I don't think it would require any invention to know that the removal of the cog wheels and apparatus from Wood's Machine, would remove the obstacle to the free motion of the trucks. My understanding of the engine in Wood's is, that the intention is to distribute the weight on each of the wheels equally. The only difference between Chapman's truck, and the truck in the Experiment is, that it works the other end foremost. The general manner of constructing the two and attaching them to the body is the same. Chapman's locomotive would fall further short of answering the present wants of a railroad than the old steamboat of Fulton would of the present steamboats.

[The model of such a timber car as Williams described having a frame, being shown to the witness, he testified as follows:]

A car made like the model with the trucks connected by bolsters and a long frame contain all the principles of the running part of the eight-wheel car. The only difference between the car represented in the drawing of the Columbus and that in the Plaintiff's specification and drawing is, that in the Columbus the draft is by a perch from the truck instead of the body of the car, and in the arrangement of the wheels and trucks as to distance apart.

On being again *re-examined* by the counsel for the Plaintiff, the said William C. Hibbard testified as follows:

The text of Wood says that the object of the arrangement of the trucks is to distribute the weight equally on the rails.

DEPOSITION OF PETER H. DREYER.

PETER H. DREYER, a witness called by the Plaintiff, testified as follows :

I reside in New York ; am City Surveyor ; I have been engaged on railroads in constructing the tracks ; I am acquainted with the building of cars and with their construction and operation. I have read the specification of Plaintiff's patent and examined the drawing ; the distinctive characters of this plan are first, to construct the trucks with the wheels as near each other as possible, thereby bringing the axles more in a line with the radii of the circles. The next feature is an under and upper bolster, the upper bolster being fastened to a long frame or body and resting on the under bolster, which is connected to the truck. Thirdly, a pin or bolt running through the bolster to allow the trucks to conform to the curves. The best mode of applying the motive power to bring into action the principle of the two trucks is to connect it to the frame ; if attached to the truck, free action is prevented, and would have a tendency to throw the truck off the rails.

The principle of Plaintiff's plan would not be carried out if all the wheels of the car were at an equal distance apart. I do not consider a locomotive with a pair of driving wheels at one end, a truck at the other as involving the principles of Plaintiff's invention.

The introduction of a truck as a substitute for the driving wheels would produce a new mechanical action in turning curves. I don't consider the two four-wheeled platform cars connected by a perch, and arranged to draw timber, as an organized eight-wheel car, such as Winans describes, or equivalent to it ; in passing on to and off of curves the timbers must slide. The substitution of a body for the timbers would not constitute an eight-wheeled car. I am acquainted with cars on Defendant's road ; they are similar to the Plaintiff's. The distance between the wheels of each truck may be varied according to the nature of the curves, being placed further apart the longer the curves. Placing the two trucks at a great distance facilitates the turning of curves ; it also operates to steady the motion. In laying a track, we generally elevate the outer rail in the curves of the road, in order to throw the centre of gravity towards the inside, for the same reason that a person riding in a circle leans inward to resist the centrifugal force.

It is not necessary there should be a leaning the whole length of the bolster ; a foot each side of the centre would generally be sufficient.

I understand the description and drawing in Wood's Treatise. I do not consider that a practical locomotive carriage could be made from the drawing ; there are two trucks, the inner axles being connected by a cog wheel, the motive power connected with the inner wheel ; the free motion of the trucks would be impeded by the meshing of the cogs ; there would be considerable strain on the king-bolts. The amount of the strain would be the whole leverage from the king-bolt to the cog-wheel. The wheels are represented as equidistant, which is not according to Plaintiff's plan. I think the difference between the Plaintiff's plan and that shown in the drawing in Wood's, are material. A running carriage, built with those proportions, dispensing with the loco-

motive, would not conform to the description in Winans' specification. The motive power in the engine in Wood acts on the trucks. The object in that engine, was an equal distribution of the weight on the track.

The witness, being *cross-examined*, testified as follows :

I am a mechanic; I was formerly a carpenter by trade; I was engaged in building cars; am not a wheelwright; never constructed locomotives or carriages for locomotives. I have superintended the laying down of tracks for railroad companies.

My duty as City Surveyor is to make out assessments and make contracts for improving streets. I have taken contracts for constructions on railroads and have some knowledge of engineering. I use a theodolite in leveling. I have worked on frames of cars and on their bodies. The rims of the wheels in Defendant's cars are about fifteen inches apart. The nearness of the wheels is essential, because their axles then come nearer in line to the radii of the curves; it is an essential feature in Plaintiff's plan to place the wheels of each truck as near together as possible and to extend the body; and you could not have that principle if you had all the wheels equidistant apart.

DEPOSITION OF WALTER R. JOHNSON.

WALTER R. JOHNSON, called by the Plaintiff, testified as follows :

I reside in Washington city: am at present a Civil Mining Engineer and Solicitor of Patents. My pursuits for the last twenty years have been connected with the investigation, publication and teaching of the principles of Natural Philosophy, Mechanics, and Chemistry. From 1828 to 1837, I was connected with the Franklin Institute of Pennsylvania, as Professor of Mechanics and Natural Philosophy. I was connected from 1839 to 1843, with a medical institution in Philadelphia, as Professor of Natural Philosophy and Chemistry. I was engaged during 1843 and 1844, in experimenting on the strength of iron, and the evaporating power of coal; and since 1844 I have been engaged, in part, in investigating the qualities of coal and their mineral characters and localities; and since 1848 have been engaged in my present pursuits.

From my first connection with the Franklin Institute until 1848, I was more or less engaged in investigations on subjects of inventions pertaining to science and the arts. I have examined Plaintiff's specification and drawing. Its distinctive characters are: placing the body of the car upon two trucks, each of four wheels, with the axles of each truck placed as near to each other as conveniently may be, and placing the trucks as near the ends of the car and as remote from each other as conveniently may be; each truck turning on a swivel or centre-bolt, so as to allow free motion to turn horizontal curves, the traction being by the body of the car. There is no invention of new parts, wheels, axles, or trucks; truck frames, variously constructed car bodies, eight wheels and connecting links for connecting cars in a train, were well known previously to Winans' patent.

But the Plaintiff claims the combination and arrangement of parts in a peculiar way, for the accomplishment of certain purposes stated in the specification. To accomplish these purposes it is best to apply the

traction to the body of the car, so far as regards that tractive force that is exerted between one car and another in a train. If a locomotive draw only the tender, it would probably make little difference whether the connection between the locomotive and car is to the body or the trucks, that is, so far as the connection between the locomotive and the first truck is concerned if the traction is in the direction of the curve to be followed; but as soon as the tender to a locomotive becomes a drawing power, then the coupling must be by the bodies; that is very important; when the draft is alternately through the body and the trucks, each pin has to draw the whole load behind it, and it is therefore more difficult to turn it. But when the cars are coupled by the body, each pin has merely to carry the load on its truck, instead of the load of the whole train behind; but when a train of cars is to be drawn, the attachment to the body is important.

[The drawing of the Columbus being shown to the witness, he says:]

This drawing represents the tractive power as applied by a perch to the trucks. The wheels of the trucks are not placed near each other, in which particular it differs from the Plaintiff's plan.

I don't consider the timber car as an organized eight-wheeled car, like that in Plaintiff's patent. The timbers must slip when a car comes on a curve. If a body were attached firmly to the platform, something must break. In Morris's patent I don't find the distinctive arrangement which constitutes the peculiar character of Plaintiff's invention; there is no provision in it for passing lateral curves, but only for passing vertical inequalities; the difference between the two is a very substantial difference. In Jervis' plan of a locomotive carriage, with one pair of driving wheels and two pairs of running wheels, there are single features in certain parts like features in Plaintiff's plan, but not two trucks placed near the end of a long running car, having connection made through the body. A car with a truck at one end, and a pair of driving wheels at the other end, would not run like Plaintiff's.

I find only a portion of Plaintiff's invention; there is a truck turning on a swivel, but not two trucks, one at each end. The substitution of another truck for the driving wheels would be introducing a new mechanical action. This new mechanical action is to be found in Plaintiff's patent. I have read the description in Chapman's specification, in the 24th volume of the Repertory of Arts, &c. I do not find a running carriage described, similar to the Plaintiff's. A locomotive carriage is described to be drawn by a chain along the road. It is practicable, but not a practical way of moving a car at this day.

The object of Chapman seems to have been to distribute the weight by multiplying the wheels. Supposing Chapman's to be a running carriage, it is one in which the distribution of the weight throughout the car is intended to be effected by the simple distribution of the weight on the wheels, without regard to the nearness of the axles and the distance of the trucks. In Chapman's locomotive the weight is distributed at equal distances on the rails. Figure No. 1 of the drawing represents a four-wheel carriage. The next is one of six wheels, the forward pair of wheels being rigid. The truck of four wheels has a swivel, and is capable of adjustment for turning curves.

When Chapman speaks of constructing a car with eight wheels, he speaks of distributing the load on eight wheels, and does not indicate

the idea found in Winans' specification, that the wheels are to be near together, and the trucks far apart. If the eight wheels of Chapman were distributed as Chapman indicates, on a car of the usual length used on our roads, they would not easily conform to the curves; no degree of curvature can exist that will not be relieved by the near approach of the axles, and the longer the distance apart of the trucks the steadier will be the motion of the cars. These distinctive features I don't find in Chapman's locomotive.

A car constructed on Plaintiff's plan may run with one truck on one track and the other on a parallel track. I have seen this done. This could not be done with a car on the plan of the "Experiment," because the driving wheels would be perpetually restrained by their fixed axles. I have examined the description and drawing of a locomotive in Wood's Treatise. I find it represents a locomotive in which all the wheels are driving wheels, and are geared together by toothed wheel and pinion works; the motive power being a steam engine connected with the carriage or frame, and the driving machinery seems to be connected with two trucks. There is a wheel in the centre connected with the shackle bar that meshes into another wheel which connects with one of the middle pair of the driving wheels of the four, and between that pair and the one next to it is another cog and so on.

I think the impingement of the cogs would impede the action of the carriage by interfering materially with the free play of the trucks in moving around curves. I don't perceive any arrangement of the wheels of each truck near together, or for the distant coupling of the trucks for the objects stated in Plaintiff's specification; nothing is said in this work about running carriages; all running carriages were then made with four wheels.

The witness being *cross-examined*, testified as follows:

By arrangement in machinery I understand the placing the parts in particular positions in relation to each other.

In the Plaintiff's specification the arrangement of eight wheels is making two bearing carriages or trucks, and placing the two trucks remotely from each other; that is remotely as compared with the distance of the wheels from each other in the trucks, and with the former distance of the wheels from each other in four-wheel cars; and I consider remoteness of the trucks from each other as compared with their distances from the ends of the car as a feature of Winans' plan. No specific distance is indicated. It will depend on the length of the car. Of course the trucks cannot be more remote than the whole length of the car, and the remoteness of the trucks is with reference to the length of the cars. In the drawing, the centre of each truck is further from the centre of the car than from the end of the car nearest to it.

The specification does not direct at what distance apart the trucks are to be placed on a car of any specified length.

The connection of the wheels with the body is represented as being made by an upper and lower bolster to each truck with a centre-pin or bolt descending through the upper bolster into a cavity in the lower bolster; the upper bolster is adapted to touch the lower bolster in certain parts, to avoid rocking.

In Chapman's specification in the Repertory of Arts, I find described a bearing carriage of four wheels made in a truck frame, and a car-

riage upon it connected by a centre-bolt which gives the carriage the property of turning lateral curves. It is stated in the specification of Chapman in the Repertory of Arts, that another truck may be substituted for the fixed axle with its wheels. I am informed by the specification that another truck, similar in all respects to the first described, may be substituted for the two wheels and fixed axle; and I understand they are to be connected to the carriage in the same way as the first truck, although there is no direction or instruction in the specification to that effect.

It appears by the drawing in the Repertory of Arts, that the power of traction in Chapman's carriage was applied to the four-wheel car where the body and the truck are one; therefore, the traction is applied to the truck. The model exhibited is a fair representation of the eight-wheeled carriage in Wood, stripped of the cog-wheels and other apparatus by which it was to be moved.

I think a curve of thirty feet radius is as small a curve as I ever saw on railroad. The truck of the Experiment, as exhibited in Jervis' drawing, and the truck described in Chapman's specification in the Repertory of Arts, are constructed and connected to the carriage substantially in the same way as Plaintiff's trucks are constructed and connected. There is nothing said in Plaintiff's specification respecting the mode of attachment to the motive power and to other cars, but I find it delineated in the drawing.

The drawing of the Columbus differs from the drawing of the patent in regard to the relative distance of the centres of the trucks from the centre of the car, in comparison to the total length of the car. The wheels of the Columbus are further apart also. They differ also in the draught of the Columbus being by the trucks when the wheels of the bearing carriages are so far apart as to interfere materially with their action on the curves of the road on which they are used; they will not interfere with Winans' patent. The position of the axles of the Columbus would, I should think, render it unsuitable to traverse some of the shortest curves. If Winans' cars were to traverse roads of long curves, I should think the Columbus would be within his plan as regards the position of the axles. The curves were very short in the Baltimore and Ohio Railroad, and I do not think the Columbus would for this road be within the distinctive characteristics of Winans' invention, so far as the nearness of the wheels together is concerned. Placing it on another road with long curves would bring it within the characteristics, if the trucks were placed so far from the ends as to have the ill effects which Mr. Winans wishes to avoid; this would take the car out of Mr. Winans' plan. It would take it out of the invention if the trucks were so far apart as to defeat Mr. Winans' object.

I should think from the drawing, the trucks of the Columbus are placed too far from the ends of the body to bring it within Plaintiff's patent; there is an approximation to it, but rather a remote one. I think if the Columbus were divided into two parts, each part would rest nearly centrally on one set of wheels, and that, in my opinion, is too far from the end.

The Plaintiffs here rested. The Defendants *re-called Mr. Pond*, who testified that none of the Defendant's trucks are connected by a single spring, such as is described in the Plaintiff's specification.

It was agreed by the counsel of the respective parties, that if the jury think the Plaintiff entitled to recover, the damages shall be assessed at one hundred dollars.

The cause was summed up to the jury, and the Defendant's counsel before the Judge charged the jury, delivered to him, in writing, the following prayers, and requested the Court to charge and instruct the jury in conformity with these prayers :

THE TROY AND SCHENECTADY RAILROAD COMPANY *adsm.* ROSS WINANS.

The counsel for the Defendants respectfully pray the Court to instruct the jury :

I. That a patent cannot be obtained for a purpose, intent, end or object, but must be for the machinery or process by which such purpose, intent, end or object is to be accomplished, and whatever may be the purpose or object of the improvement, the patent will be void if the machinery or process by which it is to be effected is not new.

II. That the Plaintiff's patent is (in the words of his patent) claimed to be "for a new and useful improvement in the construction of cars and carriages intended to run on railroads."

That this includes all kinds of carriages or cars intended to run on railroads.

III. That by the Plaintiff's summary as expressed in his specification, this improvement is claimed to consist only of the manner of arranging and connecting the eight wheels which constitute the two bearing carriages with a railroad car.

IV. That the mode of attaching the car to the motive power, or to other cars to be drawn in trains, forms no part of the improvements claimed by the Plaintiff, and cannot therefore be taken into consideration in determining whether all or any part of the improvement claimed by Plaintiff is new.

V. That an eight-wheel car is no part of the improvement.

VI. That the remoteness of the two bearing carriages from each other when attached to the car, is not so expressed or described in the specification as to constitute any part of the improvement claimed by the Plaintiff.

VII. That the improvement claimed by the Plaintiff consists only :

1st. Of the manner of arranging the eight wheels into two trucks, which constitute the two bearing carriages. That this arrangement includes the bolsters placed in the centre of each bearing carriage, and the placing the axles of each truck as near together as could be done without the flanges of the wheels interfering with each other.

2d. Of the manner of connecting the two bearing carriages to the body of the car by a centre-pin or king-bolt passed through the centre of the upper bolster, which is attached to the body of the car into the lower bolster on the two bearing carriages.

VIII. That if the jury shall find that any part of the arrangement of the eight wheels into the two trucks, or the manner of connecting these trucks to the body of the car, were known and used before the alleged improvement by the Plaintiff, the patent is void.

IX. If the jury find that prior to the alleged invention of the Plaintiff, there was published in any public work a description of a car to run on railroads, resting on two bearing carriages composed of four wheels, each having a bolster extending across in the centre between the two wheels, fastened to and forming a part of the carriage, and attached to these bolsters by a centre-pin or bolt passing through the substantial frame of the car in the centre of the bolsters, so as to allow the frame of the carriage to turn and swivel upon the bolsters of the bearing carriage, the Plaintiff's patent is void.

X. If the jury find that any part of the arrangement of the eight wheels into bearing carriages, or the manner of their connection with the frame or body of the car is described or delineated in Chapman's patent, published in the 24th volume of the Repertory of Arts, published in 1814, or in Mr. Wood's Treatise, published in 1825, the Plaintiff's patent is void.

XI. If the jury find that it was known to persons acquainted with the science of mechanics and mechanical motion, that a four-wheel carriage with its axles in close proximity would traverse a curve more easily than if further apart, then that part of the arrangement described and claimed in the specification is not new, and the patent is void.

XII. If the jury shall find that the timber car found to have been used on the Baltimore and Ohio Railroad before the car "Columbus" was built, embraced any part of the manner of arranging or connecting the eight wheels to the body of the car, as claimed in the Plaintiff's specification, his patent is void; and that it makes no difference that said timber car was only used temporarily, or for a temporary purpose.

XIII. If the jury find that the car Columbus does not substantially embody the whole improvement claimed by the Plaintiff, and shall also find that the truck of four wheels constructed by Mr. Jervis in the winter of 1832 for the Experiment, and put in use on the Mohawk and Hudson Railroad in April 1832; or that the timber car proved by Mr. Williams and Mr. Whitney to have been constructed and put in use on said road in April or May, 1832, contains any part of the arrangement or connection of the eight wheels to the body of the car claimed in the Plaintiff's specification, his patent is void.

XIV. If the Court shall be of opinion that the remoteness of the two bearing carriages, as described in Plaintiff's specification, constitutes a part of the arrangement of the eight wheels to bearing carriages and the connection to the body of the car as claimed in the Plaintiff's specification, then the patent is void, unless the jury shall find that the specification describes with sufficient precision the proper and necessary location of those bearing carriages under the body of the car, to enable a mechanic of sufficient skill to construct railroad cars, to locate the bearing carriages under the car the necessary distance apart, without any experiment, invention, or addition of his own.

XV. If the jury shall find that a car constructed as described in Plaintiff's specification without side bearings at the ends of the bolsters would not be entirely safe to passengers, the patent is void.

XVI. If the jury shall find that the car Columbus embraces in substance the improvements claimed in the Plaintiff's specification, and

that said car was put into use by the Baltimore and Ohio Railroad Co. on the 4th of July, 1831, and that it was occasionally used by said Company from that time by the consent of the Plaintiff, then the patent is void.

XVII. If the proximity of the axles of the bearing carriages and any particular remoteness of those bearing carriages from each other, forms any valid part of the improvement claimed by the Plaintiff, unless the jury find that both the proximity of said axles, and the remoteness of said bearing carriages from each other in the Defendant's cars are the same as that claimed by the Plaintiff to be his improvement, then there has been no infringement and the Defendants are entitled to a verdict.

XVIII. The patent is void on its face, because,

1. There is not in the specification any sufficiently precise or certain rule for the arrangement and connection of the bearing carriages with the car, to accomplish the objects of the pretended invention.

2. The end proposed by the patentee is stated in the specification, but no means of accomplishing it are described, other than the application of known mechanical principles, in such manner as will best accomplish that end or object.

3. The claim is for an improvement to accomplish the "end proposed" by such arrangement and adjustment of things in use as will accomplish that end, but the specification leaves the rule or particular manner of arrangement and adjustment to be discovered and applied.

4. The specification leaves the manner of arrangement and connection of the bearing carriages or wheels for the accomplishment of the purpose or end the patentee has in view, as much a matter of accident or experiment as they were before the specification was written.

5. The patent is for a car to be constructed upon such known mechanical principles, and with such mechanical arrangement as may be found necessary to attain the "end" or accomplish the purpose stated in the specification and claimed, without describing what that mechanical arrangement or combination must be.

The Court then charged the jury, and among other things :

In respect to the Defendant's first prayer, the Judge stated to the jury, that it was undoubtedly true, that a patent could not be taken merely for a purpose, end, or object, but that it would in his judgment be impertinent to give any instruction to the jury on that point, because the patent in question here was not a patent for a purpose, but for the means of effecting a purpose.

To the latter remark of the Judge, Defendant's counsel excepted.

The Judge then remarked, that he had charged in accordance with the Defendants' second and third prayers substantially, to which remark the Defendant's counsel assented.

In respect to the matter of the fourth prayer, the Judge charged that although the mode of attaching the car to the motive power or to other cars in a train forms no part of the improvement claimed by the Plaintiff, he refused to charge as requested; that the jury could not take the mode of attachment into consideration, in determining whether all or any of the improvements claimed by the Plaintiff are new, but charged that the mode of attachment might be taken into consideration

for the purpose of ascertaining whether the Plaintiff had complied with the law by describing his invention, and showing how it was to be used; that the specification was sufficient if the patentee had described a carriage susceptible of an attachment of the power to the body, if the drawing showed such mode of attachment; that the Plaintiff could suffer no disadvantage from not having stated it in his written specification, and that although the drawing was not to be taken into consideration, for the purpose of measuring the extent of the patentee's claim, yet it might be considered in ascertaining whether what he claimed was new if the jury could discover that it had any bearing on this point.

To this refusal of the Judge to charge as requested in the fourth prayer, and to his instructions relative to the mode of attachment, the Defendants' counsel excepted.

The Judge then remarked, that he had charged in accordance with the Defendants' fifth prayer substantially, to which remark the Defendants' counsel assented.

To the refusal of the Judge to charge as requested in the Defendants' sixth prayer and to his charge to the contrary, the Defendants' counsel excepted.

The Court charged the jury in accordance with the seventh prayer, but added that the position of the truck at or near the end of the carriage, was to be considered as constituting a part of the arrangement claimed by the Plaintiff as his invention.

To this last mentioned instruction, the Defendants' counsel excepted.

The Judge refused to charge as requested in the Defendants' eighth prayer, that if the jury should find that any part of the arrangement of the eight wheels into the two trucks, or the manner of connecting those trucks to the body of the car, were known and used before the alleged improvements by the Plaintiff, the patent is void; to which refusal of the Judge so to charge the Defendants' counsel excepted.

The Court declined to give the instructions specified in the ninth and tenth prayers, in the form therein requested, but left it to the jury to say whether in their opinion it had been shown that the alleged invention of the Plaintiff was substantially described in either of the books mentioned in the tenth prayer, and instructed the jury that if it was so, the patent was void.

The Judge refused to charge as requested in the eleventh prayer for instruction, that if the jury found that any part of the arrangement of the eight wheels into bearing carriages, or the manner of their connection with the frame or body of the car, is described or delineated in Chapman's patent, published in the 24th volume of the Repertory of Arts, published in 1814, or in Wood's treatise, published in 1825, the Plaintiff's patent is void; to which refusal the Defendants' counsel excepted.

The Court refused to give the instructions mentioned in the twelfth and thirteenth prayers in the form therein requested; but after informing the jury that unless the Plaintiff appeared by the evidence to be the first inventor of all that by his patent he claimed as his invention, his patent was void; and after submitting to them the evidence relative to the timber carriage mentioned in the twelfth prayer, and also that respecting the four-wheel truck devised by Mr. Jervis for the locomo-

tive Experiment, and the timber carriage mentioned in the thirteenth prayer, the Court left it to the jury to decide whether or not it was shown by this evidence that the Plaintiff was not such inventor, and declined to give any other or further instructions in answer to these prayers ; to which refusal the Defendants' counsel excepted.

The Court gave the instructions contained in the fourteenth prayer, and left it to the jury to say, whether the Plaintiff had not, as it appeared to the Court he had done, sufficiently indicated the position of the trucks with respect to the ends of the carriage ; as to their distance apart, that of course must depend on the length of the carriage.

In relation to the fifteenth prayer, the Court instructed the jury that in order to find for the Plaintiff, the jury must be convinced that what the Plaintiff has patented is useful, but that any degree of utility was sufficient to support a patent, the word "useful" in the patent law being used in opposition to "frivolous" or "noxious," and that with regard to the question of side bearings, although the jury should think it better to have longer bearings than the Plaintiff contemplated, that would not warrant them in finding the patent void, if the invention was useful within the instructions given, as it was not necessary that the thing patented should be the best possible thing of the kind that could be made with, and the Court refused to charge the jury otherwise in relation to said fifteenth prayer ; to which refusal and instruction the Defendants' counsel excepted.

In relation to the sixteenth prayer the Court instructed the jury that the law allowed to an inventor a reasonable time to perfect his invention and to ascertain its utility before, in order to secure to himself its exclusive use ; it obliged him to take out his patent, that in applying this rule it was the duty of the jury to take into consideration the nature of the invention and all the circumstances of the case, but that an inventor was bound to act with sincerity and good faith towards the public, and in accordance with the policy of the patent laws. If he unnecessarily defers his application for a patent, and suffers his invention to be used except for the purposes already mentioned, and beyond what he has reason to believe necessary for these purposes, his patent will be void, and that this instruction was intended to embrace the evidence relating as well to the Winchester, Dromedary and Comet, as to the Columbus mentioned in the sixteenth prayer, and in relation to this prayer the Court refused to give any further or other instruction ; to which refusal and charge the Defendants' counsel excepted.

In relation to the seventeenth prayer of the Defendants, viz. : That if the proximity of the axles of the bearing carriages and any particular remoteness of these bearing carriages from each other forms any valid part of the improvement claimed by the Plaintiff, unless the jury find that both the proximity of said axles and the remoteness of said bearing carriages from each other in the Defendants' cars are the same as that claimed by the Plaintiff to be his improvement, then there has been no infringement, and the Defendants are entitled to a verdict.

The Court instructed the jury that in order to warrant them in finding the fact of infringement, they must be satisfied from the evidence that the Defendants have used either the same thing, or substantially the same thing, as the Plaintiff's invention, and the Court refused to charge otherwise in relation to said seventeenth prayer.

The Court also instructed the jury that the drawing, a certified copy of which had been given in evidence by the Plaintiff, was to have the same force and effect as if it had been referred to in the specification, and was to be deemed and taken as a part of the specification; to which instruction the Defendants' counsel excepted.

And the Court further instructed the jury that the application of a thing already known to a new and useful purpose might be the subject of a patent, provided the new use was not analogous to the old, and required the exercise of the inventive faculties; to which instruction the Defendants' counsel excepted.

The 6th, 8th, 11th, 15th, 16th, 17th and 18th prayers were refused by the Court, and to these several refusals the Defendants' counsel excepted. The jury thereupon retired to deliberate on their verdict, and returned into Court and delivered their verdict in favor of the Plaintiff for one hundred dollars damages and six cents costs.

The original depositions which were used in evidence, which are on file together with the drawings annexed thereto, to be produced at the argument, and either party may produce on the argument the models which were given in evidence on the trial.

DAVID BUEL, JR.,
Att'y and of Counsel for Def'ts.

EXHIBIT, No. 1.

For this Exhibit see page *425.

SPECIFICATION OF EPHRAIM MORRIS' PATENT.

EXHIBIT, No. 2.

For this Exhibit see page *418.

JUDGE'S CHARGE.

CIRCUIT COURT OF THE UNITED STATES, NORTHERN DISTRICT OF NEW YORK.

ROSS WINANS vs. THE TROY AND SCHENECTADY RAILROAD COMPANY.

His Honor, JUDGE CONKLING, charged the jury as follows, in substance: This trial, gentlemen, has been so deliberately conducted, and the whole merits of the case have been so fully investigated, that I shall endeavor not to detain you very long in summing it up.

This suit is brought to recover damages for the alleged violation of the right claimed by the Plaintiff in virtue of letters patent granted to him on the first day of October, 1834, and subsequently extended. The Plaintiff's right to maintain his action depends on the answers to be given to the two general questions: First, whether he has a good patent, and if so, secondly, whether it has been infringed by the Defendants. To enable you to decide these questions, it is indispensably necessary that you should have a clear conception of the thing of which the Plaintiff claims to be the inventor, and this is to be ascertained from the description which he has himself given of it. The law requires every applicant for a patent to accompany his application with a full, clear and exact description of his supposed invention, and it is to this description thus furnished by the Plaintiff, that resort must be had to ascertain the nature and extent of his invention. This question must, of course, arise in every case of this nature, and it is often one of no little difficulty, especially in a case like the present, where the invention consists in an alleged improvement in a thing already in use, because the party is obliged to distinguish between what is old and what he claims as his invention, and this is often very imperfectly done.

But the present case does not appear to me to involve any serious difficulty in this respect. The specification is drawn with great precision and perspicuity. Indeed, I do not remember ever to have seen a specification expressed in clearer or more appropriate terms. It is very easy, therefore, at least to understand what the patentee designed to say. He describes the carriages then already in use, and the practical difficulties resulting from the form and manner of this construction; he then proceeds to state in what respects and in what manner he has altered them for the purpose of obviating these difficulties, and it is the means resorted to by him for this purpose that he claims as his invention and improvement. These carriages had four wheels arranged in pairs, each pair having a fixed axle, and he shows the disadvantages attending the use of such carriages, especially on roads having curves of so short a radius as many of them in this country have.

"The object of my invention," he says, "is, among other things, to make such an adjustment or arrangement of the wheels and axles as shall cause the body of

the car or carriage to pursue a more smooth, even, direct and safe course than it does as cars are ordinarily constructed, both over the curved and straight parts of the road by the beforementioned desideratum of combining the advantages of the near and distant coupling of the axles and other means to be further hereinafter described."

This is the object of the Plaintiff's invention as stated by him; he then goes on to describe the means he has invented to effect the object he has specified, and here again I will read to you his own language:

"For this purpose," says he, "I construct two bearing carriages, each with four wheels, which are to sustain the body of the passenger or other car by placing one of them at or near each end of it in a way to be presently described. The two wheels on either side of the carriages are to be placed very near to each other; the spaces between their flanges need be no greater than is necessary to prevent their contact with each other. These wheels I connect together by means of a very strong spring, say double the usual strength employed for ordinary cars, the ends of which spring are bolted or otherwise secured to the upper sides of the boxes, which rest on the journals of the axles, the larger leaves of the springs being placed downwards and surmounted by the shorter leaves. Having thus connected two pairs of wheels together, I unite them into a four-wheel bearing carriage by means of their axles and a bolster of the proper length, extending across between two pairs of wheels, from the centre of one spring to that of the other, and securely fastened to the tops of them. This bolster must be of sufficient strength to bear a load upon its centre of four or five tons. Upon this first bolster I place another of equal strength, and connect the two together by a centre-pin or bolt passing down through them, and thus allowing them to swivel or turn upon each other, in the manner of the front bolsters of a common road wagon. I prefer making these bolsters of wrought or cast iron; wood, however, may be used. I prepare each of the bearing carriages in precisely the same way.

"The body of the passenger or other car I make of double the ordinary length of those which run on four wheels and capable of carrying double their load. This body I place so as to rest its whole weight upon the two upper bolsters of the two beforementioned bearing carriages or running gear. I sometimes place these bolsters so far within the ends of the body of the car, as to bring all the wheels under it; and, in this case, less strength is necessary in the car body than when the bolster is situated at its extreme ends. In some cases, however, I place the bolster so far without the body of the car at either end, as to allow the latter to hang down between the two sets of wheels or bearing carriages, and to run, if desired, within a foot of the rails."

He then goes on to speak of some particular features of this invention, and finally he states explicitly in a summary at the end of the specification, what he claims and what he does not claim, as follows:

"I do not claim as my invention the running of cars or carriages upon eight wheels, this having been previously done; not, however, in the manner or for the purposes herein described, but merely with a view of distributing the weight carried more evenly upon a rail or other road, and for objects distinct in character from those which I have had in view as hereinbefore set forth. Nor have the wheels, when thus increased in number, been so arranged and connected with each other either by design or accident as to accomplish this purpose. What I claim, therefore, as my invention, and for which I ask a patent, is the before described manner of arranging and connecting the eight wheels which constitute the two bearing carriages with a railroad car, so as to accomplish the end proposed by the means set forth, or by others which are analogous and dependent upon the same principles."

This, then, is the improvement of which the Plaintiff claims to be the inventor. I do not know that I can give you a more clear idea of it than has been given you by the reading of it. You have heard read in the course of the trial, the instruction given on a trial at Baltimore, by the Chief Justice of the United States, as to the claim of the patent; and that instruction, which seems to me to be entirely proper, and which I desire to be considered as adopting, is couched almost wholly in the very language of the specification.

It is, then, the improvement which he thus describes, of which the patentee claims to be the inventor.

The next question, gentlemen, is, whether the Plaintiff has given a sufficient description of his invention. A patentee is bound to give all the information necessary to the successful use of the invention. It is denied by the Defendants that the Plaintiff has complied with this condition, and they insist that the patent is therefore void. It is, among other things, insisted by the Defendant's counsel, that the Plaintiff ought to have specified the distance at which the trucks are to be placed from each other, and that he has not done so. This objection relates to an important part of his invention, and the successful use of it depends upon the arrangement of the wheel and truck; the two pairs of wheels in each truck must be near together, and the trucks remote from each other. The Plaintiff was, therefore, bound to give instructions as to the location of the wheels and trucks.

It is also said that he has given no directions as to the length of the body of the car, but he says that the body admits of indefinite extension, and in that he considers the value of his invention to consist. Its length, therefore, is left to be determined by choice and circumstances. He could not specify the particular number of feet between the trucks, and it appears to me that he has specified with sufficient exactness the part of the carriage where the trucks are to be placed. He says they are to be placed at or near the end of the car; sometimes he says he places them just under the end, and at others just without the end. They must, therefore, be placed near the ends of the car, or in other words as far apart as the length of the carriage will conveniently admit. It is very true that a patentee is bound to give full information to the public as to the manner of carrying out his invention, but he is not bound to inform the public of more than he knows.

It is said to be at present the practice to place the truck a little further under the carriage, but it is proper to consider the circumstances under which the Plaintiff made his invention, if such it be. At that time there was only one short railroad, the Mohawk and Hudson, in full operation, with portions of some others. It was then that he commenced the invention of a better car, and in applying for a patent he could only be required to inform the public of all that he had then ascertained, and though the carriage may have been improved by others, this constitutes no valid objection to his patent, if the thing he has invented was new and useful, and he has in good faith disclosed it to the public. A patent is none the less valid because a better thing has been subsequently invented. So far as I can discern, there is not the slightest reason to suppose that the patentee has designedly kept back anything known to himself which the public had an interest in knowing.

It is said, moreover, that the Plaintiff has not indicated in his speci-

fication the point or part of the car at which the motive power is to be applied, while, at the same time it is here insisted by his counsel that in order to the beneficial working of his invention it is highly important that this power should be applied directly to the body of the car instead of the truck, to which it appears to have been uniformly attached before his invention. If it has been shown by proof that the patentee had discovered that this change was beneficial, and had concealed the fact, it may be conceded that this would have been sufficient to invalidate his patent.

It is true that he has not stated in his written specification, where the motive power is to be attached, but this is one of those cases in which the inventor is not only permitted but required by law to accompany his application with a drawing explanatory of his invention; this drawing is to be accompanied with written references. There may be cases in which it would be better, perhaps necessary, to incorporate these references in the written specification, but the law does not require this to be done, provided the description and drawing can be rendered sufficiently intelligible without. The Plaintiff has furnished a drawing with written references on the same paper, and the witnesses tell us, as indeed we see to be the fact, that the drawing clearly indicates the point of traction.

The drawing, therefore, is none the less efficacious for not being referred to in the writing; being deposited along with the written specification in the Patent Office, it is equally accessible to the public. It is a part of the specification, and if it is intelligible, that is sufficient to satisfy the requirements of the statute. If, indeed, the infringement complained of had consisted in the use by the Defendants of this new mode of traction, the action, I think, could not be maintained, for I am of opinion that according to the true construction of the specification, the Plaintiff's claim does not extend to this mode of coupling, it not being mentioned at all in the written specification, and his claim being "the before described manner of arranging and connecting the eight wheels," &c. he has limited himself to what he had before described; nor do I understand him now to claim anything beyond this. But what the Plaintiff complains of is, the use by Defendants of his entire railway carriage. The objection to which I am now directing the attention of the jury is that he has not sufficiently described his invention, and in answer to their objection, he is entitled, as I have already said, to point to this drawing.

Again, it is said that the patentee has omitted to describe side bearings; that the provision made by him as represented by his drawing is insufficient for this purpose; that a carriage constructed according to his drawing would be unsafe and therefore useless, and that his patent is therefore void. This question depends upon the drawing. There seemed at first to be some diversity of opinion among the witnesses as to whether the bolsters shown in the drawing came in contact with each other except at the centre, but it appeared to be finally agreed, that there is a bearing shown on each side of the centre-pin, though the witnesses are not perfectly agreed as to the extent of the bearing. Mr. Pond applied his rule to the drawing, and by the aid of the scale from which the drawing was made, stated the bearing to be about sixteen inches on each side, while some other witnesses made it

less. It is testified, however, that a large number of cars were made for the Baltimore and Ohio Railway according to this specification and with this extent of bearing, that they were successful and that they have been in use ever since. Mr. Glenn says that they are made in that way still.

But, gentlemen, I have already taken occasion to observe that a patentee is only bound to disclose all that he has ascertained. At the time of this invention, railroad cars were not run at the speed at which they are now moved, and if it has been discovered since that the Plaintiff's bearings are insufficient for the present rates of speed, that can be no objection to the patent. The patentee probably had no idea of the present rates of speed, and what he desired to invent was something applicable to the rates of speed then known. Mr. Williams, a very intelligent witness for the Defendants, says that these bearings are not sufficient for our present rates of speed, but that in his opinion, they are sufficient for the rate of fifteen or even twenty miles an hour, and it is no objection to this patent that the bearings shown are not sufficient for the rate of forty miles an hour.

The next question, gentlemen, for your consideration is, whether the Plaintiff is indeed the inventor of that which he claims. This is denied by the Defendants. The first evidence upon this point on the part of the Plaintiff, is the patent itself. The patent is *prima facie* evidence of the novelty of the thing claimed, and it is sufficient evidence until the contrary is shown and this should be so; for the patentee when he takes out a patent must describe his invention and make oath to it; and moreover, no patent can properly be issued unless the Commissioner of Patents believes the applicant to be the true inventor. It is therefore right that the mere production of the patent should be sufficient evidence in and of itself of the novelty of the asserted invention until it is disproved. It is, however, the right of the Defendant to contest the novelty of the invention. If he can show by a satisfactory preponderance of evidence that the patentee was not the inventor, then the patent must fail. I understood it to be suggested by one of the counsel for the Defendants that the patentee was bound to prove beyond a reasonable doubt that he was the inventor; this is certainly a great mistake. On the contrary, it is the Defendants who are bound to prove to your satisfaction that the Plaintiff was not the inventor. The Defendants hold the affirmative, and must maintain their allegation by a preponderance of evidence.

Wherever a Plaintiff receives notice of a defence on the ground of a want of novelty in the invention, he may upon the trial, after producing his patent, either rest his evidence on the point of invention, or he may anticipate the defence, and endeavor by additional evidence to fortify his case in the first instance.

The Plaintiff here has adopted this latter course, and has given the history of his alleged invention. On his return from England in June, 1830, he entered into the service of the Baltimore and Ohio Railroad Company, having been engaged by the Chief Engineer, with the approbation of the Directors, as his assistant. He entered into a contract with the Company to give them the benefit of his talents in preparing for the successful operation of their road. They were to pay him a specified salary, and allow him the use of their workshops and tools

and of their road, for the purpose of making experiments, and it was agreed that they should be entitled to the use of what he invented, but there was nothing in that agreement which could deprive him of the right to a patent for his invention. In pursuance of this agreement, as the Plaintiff alleges, the passenger car Columbus was constructed; he insists that he was the inventor of it, and that it was built under his directions. To establish this, he has introduced the depositions of Mr. Thomas, the President of this Company, Mr. Brown, the Treasurer, Mr. Knight, the Chief Engineer, Mr. Elgar, an Assistant Engineer, and Mr. Latrobe, the counsel. These gentlemen were intimately connected with the road, and strongly interested in knowing every thing that went on. They all concur in saying that Mr. Winans devised the Columbus.

We then have the drawing which has been produced by Mr. Cromwell. He and Mr. Glenn testify that they assisted in making this very car, that the drawing was made by Mr. Winans, and furnished by him for the purpose of having a car built in conformity to it. They also testify that the draft of the running gear was copied from this drawing upon a board to work from, and Mr. Glenn states that this was done by Mr. Gatch in the shop upon a bench within two feet of where he, Glenn, was working. We then have a description of the progress of the work, and the concurrent testimony of all the persons connected with it, except Gatch, ascribe the invention to Mr. Winans. But Mr. Gatch in his deposition says that he believes himself to have been the contriver of this carriage; he was the foreman of the shop where it was made, and says that according to his recollection, the drawing furnished by Mr. Winans represented only the body of the carriage, and that the drawing of the trucks on the board was his own original work. This diversity of recollection is somewhat remarkable, and it may not be easy to account for it; the explanation suggested by one of the counsel for the Plaintiff is, that Gatch having been engaged in the construction of the cars, and having thus at once become familiar with all its parts, which, after all, are few and simple, may have erroneously imagined that it was his own invention.

But it will be for you, gentlemen, to say how the fact is, and whether the recollection of Mr. Gatch ought to prevail against that of all the witnesses officially connected with the road whom I have named. You will bear in mind also, that it was the especial duty of Mr. Winans to direct his attention to improvements of this nature, and that this was no part of the duty of Mr. Gatch, whose business it was to see that the mechanical work committed to his charge as foreman, was done, and to labor upon it himself.

It appears from the drawing of the Columbus, and from the evidence, that the trucks were placed at a considerable distance from the ends of the body of the carriage, and that the wheels composing the trucks were placed much further apart than in the car described in the patent; that the power was attached to the truck instead of the body, and that the axle ran in friction boxes. The Columbus was put into use late in June or early in July, 1831, when a trial trip was made with it to Elliott's Mills; the witnesses say that it was used with horse power; that it did not work well and was not satisfactory, and that it sometimes ran off the track. Other eight-wheel cars were subsequently built, but

none until 1833. Little seems to have been at that time done upon the road, and but few cars to have been needed. The witnesses say that the Columbus was used only occasionally, that Mr. Winans was not satisfied with it, and that he subsequently caused the Winchester, the Dromedary and the Comet, to be constructed. The precise date of the construction of these does not appear; but the Winchester seems to have been made in 1833, and the Dromedary and Comet early in 1834. The witnesses gave the same account of these as of the Columbus, that they did not work well, were unsatisfactory, and that there was a desire to get something better.

In October 1834, the carriage described in the patent is stated by the witnesses to have been devised by Mr. Winans, and to have been formally adopted by the Company, and directions were then or soon after given for making a considerable number; they were made during the fall and succeeding winter, and in the spring of 1835 were put on the Washington Branch. All the witnesses represent Winans as engaged in devising a suitable car, and with the exception of Mr. Gatch, represent him as the original and only inventor. This is evidence on the point of novelty, given by the Plaintiff in addition to his patent.

On the part of the Defendants, however, it is insisted that carriages substantially like that in question, were previously described in certain public works, and to establish this they produce two English books, *Wood on Railroads*, published in 1825, and a volume of the *Repertory of Arts*, published in 1814. They insist that each of these contains a description and drawing of what is substantially like the railroad car which the Plaintiff has patented. I shall not enter into a detailed explanation of the drawings and descriptions contained in these books, nor recapitulate the views and arguments concerning them, which have been so elaborately presented to your consideration by the counsel on the one side and the other, but shall content myself with calling your attention presently to some principles of law applicable to the subject.

Before doing so, however, it is proper also to remind you, that in addition to what appears in these English works, it is insisted that the whole of the Plaintiff's invention is to be found in a carriage invented by Ephraim Morris, in 1829, for the purpose of conveying boats from one level to another on the Morris Canal, thereby dispensing with the use of locks for that purpose. A model of this carriage has been produced, and the patentee himself has been brought as a witness. He is of opinion, it seems, that his car is the same in principle as that of the Plaintiff. I have little to observe concerning it; it seems to me, I confess, to be rather a far fetched thing, neither designed nor adapted for any such purpose as the Plaintiff's car. It was made to surmount a series of vertical angles, formed by successive inclined planes, and it is therefore provided with several four-wheeled trucks, the wheels of which, on each side, rise or fall alternately, so as to adapt them to the support of the carriage on the varying planes which it had to encounter in its progress. But it is very clear that there is nothing in this arrangement to fit it for use on a curved railroad. Mr. Morris had, in its invention, no view to the objects which governed the patentee in this case, and consequently his carriage looks like a different thing from the Plaintiff's. But, gentlemen, the question of its substantial identity, is a question of fact, and it is for you to decide it.

It is shown also, that before the construction of the Columbus, a timber car on eight wheels was used on the Baltimore and Ohio Railroad; two common earth or stone cars, each with four wheels, at a considerable distance apart, were attached together by a reach, for the purpose of transporting long timber. To avoid the difficulty of turning the curves, a bolster was put upon each car and a centre-pin through the middle of each bolster, and on these bolsters the timber was placed; the power was applied to the truck, there being, indeed, no other place to apply it; and it has been testified and explained by the witnesses, that although these moveable bolsters would facilitate the passage of this vehicle around curves, the loading would nevertheless crowd and slide upon them. It is denied also, by the Plaintiff's counsel, that this timber carriage can properly be regarded as an organized vehicle, being made up for temporary use of parts designed and generally separately used and for other purposes, and that it is idle to pretend that it is like the passenger car described in the patent. Of this you are to judge.

It is further alleged by the Defendants that the Experiment and John Bull locomotives, each with a single truck under the forward end, and the timber car used by Mr. Williams on the Mohawk and Hudson Railroad, were substantially the same thing as the Plaintiff's car. But these things were all introduced in 1832, and although before the date of the patent, were subsequent to the construction of the Columbus. The Plaintiff shows that whatever these things contained which is embraced in his patent, were contained also in the Columbus; he insists, therefore, that he is in fact the first inventor of them. If this is so then they do not stand in his way.

A great deal has been said in the course of the trial about inventive power, and the *experts* have been asked whether the differences between the Plaintiff's car and those things which preceded it, required the exercise of the inventive faculty. On this point witnesses have been examined on both sides. The Defendants' witnesses say that these prior inventions were substantially like what the Plaintiff has patented, and that it required no genius, after seeing those things, to construct the Plaintiff's car. The experts upon the other side express a decidedly opposite opinion. It is probable that among these gentlemen there is really no great diversity of opinion; but that they attach different meanings to the words invention and principles, &c., and that both speak truly according to their conceptions.

It is right in cases like this, to call experts to give their opinion: other witnesses speak as to facts; but here the opinions of persons skilled in the subject matter of the controversy are asked, and I cherish an habitual respect for the opinions of learned men, thoroughly skilled in a subject on which they are called to speak; but unfortunately they give opposite answers to the same question, and where, as is very apt to be the case, in patent causes, about the same number of experts is called on each side, the case may be left where it would have stood if they had not been called at all, and the jury are in the end obliged to rely upon their own judgments in deciding upon the question on which they, the experts, have given their opinions. Not that evidence of this nature is to be rejected because it is conflicting; but the jury are to determine for themselves upon the weight which ought to be given to it,

upon the one side and the other. And for this purpose it is the duty of the jury in these, as in all other cases, to observe the demeanor of the witnesses under oath, and to observe whether they testify deliberately and with proper reflection, and whether they appear to understand the subject well, and to give such weight to the evidence of each as it shall appear to deserve.

But it is important, gentlemen, that you should understand the precise nature of this objection of the want of novelty in the invention. It is not pretended that any other person previously invented a railroad passenger carriage like the Plaintiff's; all that is insisted is that the things which were before in use for other purposes were so nearly like this that there is no merit in the Plaintiff's invention which entitles him to a patent. The objection is that he has at least but applied an old thing to a new use.

The mere application of an old thing to another use is not the subject of a patent, if it be only to what the law denominates an "*analogous*" use. Thus it has been said, that after the invention of a spoon for the purpose of eating soup, a patent cannot be obtained for the discovery that it could be conveniently used also in eating peas. Nor could there be a valid patent for the use of a coffee mill in grinding pepper. In such cases no ingenuity at all is required to discern the applicability of the old implement to the new use. It is a mere dictate of common sense.

But it is a mistake to suppose that the right to a patent depends on the amount of ingenuity, thought, skill, or experiment, which has led to the invention. Invention means to find out, and it is no matter how the thing is found out; a mere lucky thought may give a man a right to a patent, provided it be of something new and useful. Very often a man in trying to find out one thing finds out another, and yet, though his discovery be not the effect of design, but of mere chance, he is not on this account the less entitled to a patent for it. It is a mistake, therefore, to suppose that to render an invention patentable, it must appear to have been the fruit of extraordinary genius or talents or laborious study; it is no matter how simple the thing is; some of the most important improvements in the history of human progress have been exceedingly simple, or at least now appear so, and there is always danger of doing injustice in estimating the merit of inventions, because when we have become familiar with an invention it may appear to have been very easy when in truth it was far otherwise.

One part of the evidence in the present case will serve to illustrate this. I allude to the deposition of Mr. Jervis, one of the Defendants' witnesses. The effect of it is to show that he devoted a great deal of time and thought before he succeeded in applying the four-wheel truck usefully to the locomotive engine. Mr. Jervis is conceded to be a man of high endowments and of great eminence as a Civil Engineer. I will read to you his account of the introduction and improvement of the engine on the Mohawk and Hudson Railroad.

"I have paid," he says, "a great deal of attention since I have been connected with railroads, to the construction of locomotives and cars. I have a good deal of knowledge of the principle upon which the running part of a locomotive and cars which are now used, and which have been in use since I have been engaged in

my profession, have been constructed and used. My attention has been particularly directed to the subject of the arrangement of the wheels of locomotives and cars, to facilitate the running of locomotives and cars on curves; my attention was very early directed to that subject. It was a subject on which I had often thought a great deal, but made no experiments until 1831. In 1831 and early in 1832, I was very much engaged in devising some means by which four wheels could be substituted for two, as the leading wheels of the locomotive, and finally prepared a plan by which the forward end of the locomotive was supported by a sort of independent carriage, consisting of four wheels. These wheels were placed near to each other, and working under the main frame of the engine, which rested mainly on the outside timbers on friction rollers, supported in its lateral position on the frame of the independent carriage by a centre-pin, and this independent carriage being a substitute for the two wheels formerly used."

Mr. Jervis, you will see, here represents himself to have been, as he doubtless was, an original inventor or contriver of the great improvement which he thus describes; but this was the year after Mr. Winans made a like application of four-wheeled trucks to the Columbus, and about the time of a similar improvement made by him on the locomotive Herald, as testified to by Mr. Alexander.

Now you have seen that both the carriages described in the English books, to which I have referred, are locomotives, designed, however, for purposes very different from the transportation of passengers over long railroads; one of them is exhibited in the drawing with but six wheels, but the inventor has said that where the load was so heavy that it would injure the road, a double pair of driving wheels might be substituted for the single pair of driving wheels with fixed axles, and this suggestion is relied on by the counsel for the Defendants to disprove the novelty of the Plaintiff's invention.

Now these books were equally accessible to Mr. Jervis and to Mr. Winans, and, considering their characters and the nature of the pursuits of these gentlemen, it seems not unreasonable to conclude that they were both acquainted with them. But we see nevertheless, from the evidence of Mr. Jervis, that it was only after long and laborious study, that he succeeded in making an improvement in the locomotive corresponding with that which it is insisted Mr. Winans made in the passenger car. The locomotive in use on the English railway, had one pair of running wheels on a fixed axle, as the passenger carriages both in England and those in this country (then few in number) had a single pair of wheels on a fixed axle at each end; and Mr. Jervis, after the earnest and persevering devotion of his faculties to the subject, and as far as we are apprised, with all the lights possessed by Mr. Winans, at length succeeded in devising and adapting a four-wheel truck for the support of the forward end of a locomotive as Mr. Winans did in devising a like improvement for the support of each end of a passenger car. Now, with these circumstances before us, I must say that it seems to me to be requiring a great deal at your hands to ask you [?] say that there is no merit in what the Plaintiff claims as his invention. But, gentlemen, it is for you to determine whether you find in it anything, substantially different from these other things previously in use.

No one, I believe, pretends that any one of them could be beneficially used for the conveyance of passengers on railways, without extensive modifications; but very slight changes of mechanism may sometimes

be the subject of a patent. A case which has given rise to the litigation in our own Courts, may seem to exemplify this; the patent was for an improvement in the casting of rollers or cylinders. It was known before, that if a revolving motion could be given to the molten iron when poured into the mould, this motion, by force of the centrifugal tendency thus communicated to the fluid, would produce the useful effect of throwing the pure iron to the outside leaving the dross within; and it had long been desired to discover a means of producing this revolving motion in casting rollers or cylinders. A workman employed in an iron foundry at Pittsburgh, discovered that if the melted iron, instead of being poured into the mould in a vertical or horizontal direction, was poured in obliquely, the revolving motion would be obtained. For this purpose it was only necessary to change the direction of the tube already in use, and this is what the man did, and he obtained a patent for his invention, having thereby produced a new and useful result. Another illustration, by an English judge, is this: if a surgeon goes to a mercer's shop, and sees him cutting velvet or silk with a pair of scissors, and he says, I see how well your scissors cut, and I can, by putting a knob at the end, use them instead of a lancet to cut skin, he might get a patent for that.

The general principle is this, that wherever a man finds out by accident or design, by much or little study, a new and substantially useful thing, and shows how it may be usefully applied, he is entitled to a patent, and the question here for you to decide, gentlemen, is, whether the Plaintiff has not done this. It is certainly no insignificant fact that carriages like that described by the Plaintiff in his patent have superseded the kind of vehicle previously used and are now in universal use in this country. By means of them we have been enabled to construct our roads far more cheaply than we could otherwise do, by admitting curves of comparatively short radii, and yet to run them at high speed, with long, convenient, safe, and strong carriages. But, gentlemen, the question of fact as to the novelty of the invention, is one which you are to decide, and in all that I have said I must not be understood as desiring in any manner to dictate to you the verdict you are to render on this point.

But it is further argued on the part of the Defendants, that admitting the invention of the Plaintiff and its novelty, he has *abandoned* it, by suffering it without objection to go into public use, in the Columbus, the timber cars and the locomotives, and that he cannot now reclaim it. If what is asserted as a fact be true, this result will follow as a legal consequence; thus for example, assuming that Mr. Jervis was the first inventor of the improvement described by him in the locomotive, not having at the time taken a patent for it, and having permitted it to become publicly known and used without objection, he has no longer any right to claim it as his own exclusive property. The law in this respect is just, for otherwise the public would be deceived, and the inventor, after first making all the profit from his invention that he could without a patent, might still secure to himself its exclusive use for fourteen years longer. Does this case come within the rule and within the reason of it, and has there been an abandonment by Mr. Winans of his invention?

The answer given to this objection by the Plaintiff is, that he did not

in fact perfect his invention until the fall of 1834. It is true the Columbus was built and put into use in 1831; but it is described by the witnesses connected with the Baltimore and Ohio Road as imperfect and unsatisfactory, and it is insisted that the whole intermediate period until the fall of 1834, was employed by the Plaintiff in making the necessary experiments to perfect it. It was during this period that the other three cars were built, and considering the importance of the subject and the natural anxiety evinced by the gentlemen charged with the interest of the road, as represented by themselves in their depositions, this explanation of the delay seems reasonable. It was not until the fall of 1834 that a carriage of definite form and arrangement was agreed upon and the application of the Plaintiff for a patent seems to have been simultaneous with this determination. Now the law allows to an inventor a reasonable time to make experiments for the purpose of maturing his invention, and ascertaining its practical utility. The object of the patent law is to benefit the public by stimulating ingenious men to the useful exercise of their inventive faculties, and this object is best attained by allowing them sufficient time to achieve the highest degree of success of which they are capable. The law, with certain limitations, accordingly permits this.

If an inventor was required to take out a patent, if at all, upon the first occurrence of a thought of something, apparently promising utility, not only would the policy of the law be obstructed, but inventors would be harrassed and subjected to unnecessary expense. The law, however, requires the inventor to act in this respect with sincerity, good faith, and prudence.

In applying these principles to cases as they arise, deference must necessarily be had to the particular circumstances by which they are characterized. If the invention be of a nature to admit of the necessary experiments by the inventor in his own house, a more stringent rule may rightfully be applied to the case, than to one in which such experiments can only be made in public. Such is the nature of the Plaintiff's alleged invention; and he is entitled to a liberal interpretation of the law of abandonment. It was only on the Baltimore and Ohio Railroad and by the assistance of many persons, that the reality and utility of his supposed invention could be tested, and it was stipulated between him and the Company that he should have the use of the road for this purpose. But it is testified that his cars did not work well, and that from time to time he changed their construction, and that finally, in the fall of 1834, he completed his invention and obtained his patent.

In short, gentlemen, you are to decide whether, under all the circumstances of the case, the Plaintiff is to be considered to have dedicated his invention to the public or to have lost his right by neglect; in other words you are to decide whether he has not fully and fairly acted up to the spirit of the law; if so, his patent is not invalidated by delaying his application for it.

Lastly, it is denied by the Defendants that they have infringed the Plaintiff's rights, admitting the validity of his patent. Several witnesses have testified, in general terms, that the carriages in use on the Defendants' road, as well as on the other railroads in this State, are substantially like that described in the Plaintiff's patent; and Mr. Pond testifies that he saw cars in use upon the Defendants' road, hav-

ing certain iron work upon them made by him for the Defendants; while on the other hand, some of the witnesses for the Defendants have pointed out certain differences between these carriages and that of which the Plaintiff claims to be the inventor.

But, gentlemen, this question of infringement is one upon which you are to form and express your own judgment. It may not be amiss to observe, that it is no reproach to the Defendants in particular, that they infringe the Plaintiff's patent, if they do so, and the Plaintiff is not seeking exemplary damages from them. It is stated to be his desire simply to settle his rights, and it is accordingly agreed that if you find for the Plaintiff the damages shall be assessed at one hundred dollars.

After concluding his charge, his Honor, Judge Conkling, in answer to several prayers for instructions offered by the Defendants' counsel, further instructed the jury in substance as follows:

That it was undoubtedly true that a patent could not be taken merely for a purpose, end, or object, but that he doubted the pertinency of any instruction on that point in this case, because the patent here was not for a purpose, but for the means of effecting a purpose;

That the specification was sufficient if the patentee had described a carriage susceptible of an attachment of the power to the body, and if the drawing showed such mode of attachment, and that the Plaintiff suffered no disadvantage from not stating it in his written specification, and although the drawing was not to be taken into consideration for the purpose of measuring the extent of the claim, yet it might be considered in ascertaining whether what he claimed was new;

That the patent was valid if the Plaintiff's car was substantially on the whole a new and useful thing;

That if a thing substantially like the Plaintiff's car, had been described prior to his invention in some public work that had been produced, then the patent was not good; but that it was not enough that the description should merely suggest the idea of the invention;

That it was a question of fact for the jury, whether the specification was sufficiently exact and intelligible in reference to the position of the trucks;

That, in order to find for the Plaintiff, the jury must be convinced that what the Plaintiff had patented is useful, but that any degree of utility was sufficient to support a patent—the word useful in the patent law being used in opposition to frivolous or noxious; and that with regard to the question of side bearings, although the jury should think it better to have longer bearings than the Plaintiff contemplated, that could not take away the utility of his invention, as it was not necessary that the thing patented should be the best possible thing of the kind that could be made;

That if the jury believe that the intermediate time between putting the Columbus into use and the taking out of his patent was devoted by the Plaintiff in good faith to perfecting of his invention, he cannot be considered as having abandoned it; but that if the invention was perfected in the Columbus, there could be no need of farther experiment;

That in order to warrant the jury in finding an infringement by the Defendants, they must be shown to have used either the same thing, or substantially the same thing, as the Plaintiff's invention.

The jury thereupon retired to deliberate on their verdict, and returned into Court and delivered their verdict in favor of the Plaintiff, for the stipulated damages and costs.

[For charge of Chief Justice Taney referred to and adopted by Judge Conkling see p. *423, 1131.]

UNITED STATES CIRCUIT COURT, NORTHERN DISTRICT
OF NEW YORK.SCHENECTADY AND TROY RAILROAD COMPANY *adm.* ROSS WINANS.

The motion for a new trial in this cause was argued upon the case made therein and hereinbefore set forth, at the June Term of this Court, before Justices NELSON and CONKLING, and afterwards, on the first day of September, 1851, the said Court directed the following Rule, denying a new trial, to be entered, to wit:

SCHENECTADY AND TROY RAILROAD COMPANY *adm.* ROSS WINANS.SEPT. 3d, 1851. HAMILTON HARRIS, *Plaintiff's Attorney.*

A motion having been made in this cause for a new trial, Ordered, on motion of Hamilton Harris, Plaintiff's Attorney, that the same be denied. A true copy: A. A. BOYCE, *Clerk.*

Which decision was accompanied by the following Opinion:

SCHENECTADY AND TROY RAILROAD COMPANY *ads.* ROSS WINANS.

NELSON, J. I. I have examined the various grounds presented by the counsel for the Defendants on the motion for a new trial, and after the fullest consideration, am of opinion the motion must be denied.

Most of the exceptions taken at the trial and relied on in the argument here, are founded upon what we regard as an entire misapprehension of the thing claimed to have been discovered by the Plaintiff, and for which the patent has been issued. This will be seen on a reference to the instructions prayed for by the Defendants, upon which most of the questions in the case arise. They assume that if any material part of the arrangement and combination in the construction of the cars or carriages described in the patent was before known or in public use, it is invalid; and hence various parts were pointed out by the counsel at the trial and the Court requested to charge that if either of them was not new, the jury should find a verdict for the Defendants.

Now the answer to all this class of exceptions is, that the patentee sets up no claim to the discovery of the separate parts of the arrangement which enter into the construction of his cars; these may be old and well known when taken separately and detached, for aught that concerns his invention. His claim is for the car itself, constructed and arranged as described in his patent. This, I think, is the clear meaning of the specification and of the claim as pointed out in it; proving, therefore, that parts of the arrangement and construction were before known amounted to nothing. The question was, whether or not cars or carriages for running on railroads as a whole, substantially like the one

described in the patent, had been before known or in public use, not whether certain parts were or were not substantially similar.

The argument presupposes that the claim is for the discovery of a new combination and arrangement of certain instruments and materials, by means of which a car is constructed of a given utility; and that if any one or more of the supposed combinations turns out to be old, the patent is invalid. This is the principle upon which much of the defence has been placed, but no such claim is found in the patent; no particular combination or arrangement is pointed out as new, or claimed as such. The novelty of the discovery is placed upon no such ground; on the contrary, the result of the entire arrangement and adjustment of the several parts described, namely, the railroad car, complete and fit for use, is the thing pointed out and claimed as new. This is the view taken by the CHIEF JUSTICE of the patent, in the case of the present Plaintiff, against the "Newcastle and Frenchtown Turnpike and Railroad Company," tried before him in the Maryland Circuit and which was adopted by the Judge in the trial of this case.

II. It was further insisted on the part of the Defendants, that if the relative position of the two bearing carriages to each other constitutes a material part of the arrangement in the construction of the cars, the patent was void unless the jury should find, that the specification described with sufficient precision the location of these bearing carriages under the body of the car, so as to enable a mechanic of skill in the construction of cars, to place them at the proper distance apart without experiment or invention.

It was also contended, that the remoteness of the bearing carriages from each other, was not so described in the specification as to constitute any part of the improvement. In respect to this branch of the case, the Court charged that the relative position of the bearing carriages to each other in the construction of the car, was a material part of the arrangement of the patentee, and left the question to the jury whether or not he had sufficiently described the position of the trucks, having in view their distance apart, and also from the ends of the car body, suggesting at the same time, that the location must always depend in a measure upon the length of the body. It will be seen on looking into the specification, that the location of the trucks relatively to each other under the body, as well as the near proximity of the two axles of the truck to each other, form a most essential part of the arrangement of the patentee in the construction of his cars.

Great pains have been taken to point out the defect in the existing four-wheel cars, and the impediments to be encountered and overcome in the running of cars upon railroads, as the latter are usually con-

structed. The patentee states that, "In the construction of them, especially when of considerable length, it has been found necessary to admit of lateral curvatures, the radius of which is sometimes but a few hundred feet, and that it becomes important, therefore, to so construct the cars as to enable them to overcome the difficulties presented by these curvatures, and to adapt them for running with the least friction practicable on all parts of the road. The friction referred to, is that which arises between the flanches of the wheel and the rail, causing great loss of power, destruction of the wheels and rails, besides other injuries." For this purpose, he constructs two bearing carriages, each with four wheels, which are to sustain the body of the passenger or other car by placing one of them at or near each end of it, as particularly described. The two wheels on either side of the trucks are to be placed very near each other — the spaces between the flanches need be no greater than is necessary to prevent their contact with each other."

"The car body rests upon bolsters supported on each of the two bearing carriages or four-wheel trucks, the bolsters so constructed as to swivel or turn on each other, like the two front bolsters of a common wagon. The body of the car may be made of double the length of the four-wheel car, and is capable of carrying double its load."

The truck may be so placed within the ends of the car as to bring all the wheels under it, or without the end so as to allow the body to be suspended between the two bearing carriages.

The patentee further states, that "the closeness of the fore and hind wheels of each bearing carriage, taken in connection with the use of the two bearing carriages, arranged as distant from each other as can conveniently be done for the support of the car body, with a view to the objects and on the principles before set forth, is considered by him as an important feature of the invention; for, by the contiguity of the fore and hind wheels of each bearing carriage while the two bearing carriages may be at any desirable distance apart, the lateral friction from the rubbing of the flanches against the rails is most effectually avoided, while at the same time all the advantages attendant upon placing the axles of a four-wheeled car far apart, are obtained."

"The two wheels on either side of the bearing carriages may, from their proximity, be considered as acting like a single wheel, and as these two bearing carriages may be placed at any distance from each other consistent with the required strength of the body of the car, it is apparent that all the advantages are obtained which result from having the two axles of a four-wheeled car at a distance from each other, while its inconveniences are avoided."

Among the principles stated by the patentee to be taken into consid-

eration in the construction of the car is, that the greater the distance between the axles, while the length of the body remains the same, the less the influence of shocks and concussions occurring on the road; and hence the relief from them, when the trucks are placed under the extreme ends of the body, is greater than when placed midway between the centre and the end.

It is apparent from what we have already referred to in the specification, and still more manifest on a perusal of the whole of it, that the improvement in this part of the arrangement, does not consist in placing the axles of the two trucks at any precise distance apart in the construction of the car, or from each end of the body. The distance used must necessarily depend somewhat upon the length of the car and strength of the materials of which it is built, and hence it was impracticable to specify in feet or inches the exact distance from the ends of the car body at which it would be best to arrange the trucks.

Neither do the advantages of a car, constructed and arranged as described, depend upon the trucks being placed at a specified distance from the ends, or so that there may be a specified distance between the axles. Having in view the defects in the existing cars and other difficulties to be encountered, some considerable latitude may be allowed in this respect consistent with the object sought to be attained, to remedy the defects in the existing cars.

All the principles for the construction of one for the purpose of overcoming these difficulties and remedying these defects, are particularly set forth in the description given by the patentee. We think the specification sufficient, and that the Court was right in the opinion expressed on this branch of the case.

Any mechanic of skill could readily arrange the bearing carriages in connection with the body of the car so as to secure the advantages so minutely and clearly pointed out, and which are shown to attend the practical working of cars constructed in the manner described.

III. The questions of originality and of infringement were questions of fact and depending upon the evidence, and were properly submitted to the jury. We think the weight of it decidedly with the verdict.

IV. The patent in this case was originally issued first October, 1834, and was recorded anew seventh of June, 1837, according to the Act of Congress of the third of March, 1837, (5 St. at large 191.) No drawings were attached to the original patent nor was there any reference therein to drawings. On the 25th of September, 1848, the patent was extended for the term of seven years from the first of October, 1848. The Plaintiff gave in evidence at the commencement of the trial, a certified copy of the patent and specification, certificate of the extension,

drawing with references to the same, and an affidavit of the Plaintiff made November nineteenth, 1838. The drawing was not filed at the time the patent was recorded anew, but was filed on the nineteenth of November, 1838. The counsel for the Defendant objected to the evidence on the grounds, 1st: That it appeared that no drawing was annexed to the original patent, and 2d, that the Act of Congress did not make such a drawing evidence. The court also instructed the jury in summing up the case, that the drawing, a certified copy of which had been given in evidence, was to have the same force and effect as if it had been referred to in the specification, and was to be deemed and taken as part of the specification.

The first section of the act of 1837 provides that any person interested in a patent issued prior to the fifteenth of December, 1836, may without any charge, have the same recorded anew, together with the descriptions, specification of claim and drawings annexed, or belonging to the same; and it is made the duty of the Commissioner to cause the same, or any authenticated copy of the original record, specification or drawing which he may obtain, to be transcribed and copied into books of record kept for that purpose; *and whenever a drawing was not originally annexed to the patent and referred to in the specification, any drawing produced as a delineation of the invention, being verified by oath in such manner as the Commissioner shall require, may be transmitted and placed on file or copied as aforesaid, together with the certificate of the oath, or such drawings may be made in the office under the direction of the Commissioner in conformity with the specification.*

The second section provides, that copies of such record and drawings, certified by the Commissioner, or in his absence by the chief Clerk, shall be prima facie evidence of the particulars of the invention, and of the patent granted therefor, in any judicial Court of the United States, in all cases where copies of the original record or specification and drawings would be evidence, without proof of the loss of such originals. This section also provides that no patent issued prior to the aforesaid fifteenth day of December, 1836, shall, after the first day of June then next, be received in evidence in any Court on behalf of the patentee, unless so recorded anew, and a drawing of the invention, if separate from the patent, verified as aforesaid and deposited in the Patent Office. See also section third of the same Act.

It is quite clear, upon the above provisions of the Act, that the Court was right in admitting the drawings in connection with the patent and specification in evidence. The whole together are made prima facie evidence of the particulars of the invention and of the patent granted therefor.

The weight to be given to the drawings furnished under the Act, by way of enlarging or explaining the description as given in the specification, is another question. That will depend upon the circumstances of each particular case. As a general rule they will not be effectual to correct any material defect in the specification unless it should appear that they correspond with one accompanying the original specification for the patent, otherwise, in case of discrepancy between the drawing and specification, the latter should prevail. Care must be taken to avoid imposition by the use of the newly furnished drawing, and for this purpose the specification will afford the proper correction, unless the Plaintiff goes further and shows that it conforms to the one originally filed.

The charge that the drawing in this case was to have the same force and effect as if it had been referred to in the specification and was to be deemed and taken as part of it, was perhaps too strong, as it respects the drawings furnished under the act of 1837. The principle is true as it respects those accompanying the original application for the patent, but can hardly be said to be applicable to the full extent stated, in the case of these newly furnished drawings. The principle might open the way to imposition and fraud. Assuming that there is nothing but the oath of the party attesting that the drawing affords a true delineation of the invention, the specification should prevail in a case of a material discrepancy. But admitting the instruction in this respect not to be strictly correct, and that too much weight was given to the drawing, we do not see that it would have altered the result.

The specification afforded a sufficient description of the invention independently of the drawing. Some slight additions that improved the working of the car, were open to some question, whether they were embraced in the specification, but they did not enter into the essence of the invention, or constitute any substantial part of the improvement. Time and experience usually indicate these slight additions and alterations, and they should be regarded as consequential results, belonging to the inventor. It requires time and experience usually to perfect the machine, and improvements derived therefrom are justly due to him.

V. As to the prior use of the car Columbus and others constructed by the patentee before he made application for his patent, we think the instruction of the Court correct. The law allows the inventor a reasonable time to perfect his invention by experiments; and these could be made in this instance only by putting the car in the service of those controlling lines of railroads. There were repeated failures in the experiments tried, and the cars abandoned before the perfection of the car described in the patent. These experiments and trials sufficiently

account for the previous use set up by way of forfeiture of the invention.

Upon the whole, after a careful examination of the case, and of all the points made by the Defendants on the argument, many of which have been noticed above, we are satisfied that the verdict is right, and that a new trial should be denied.

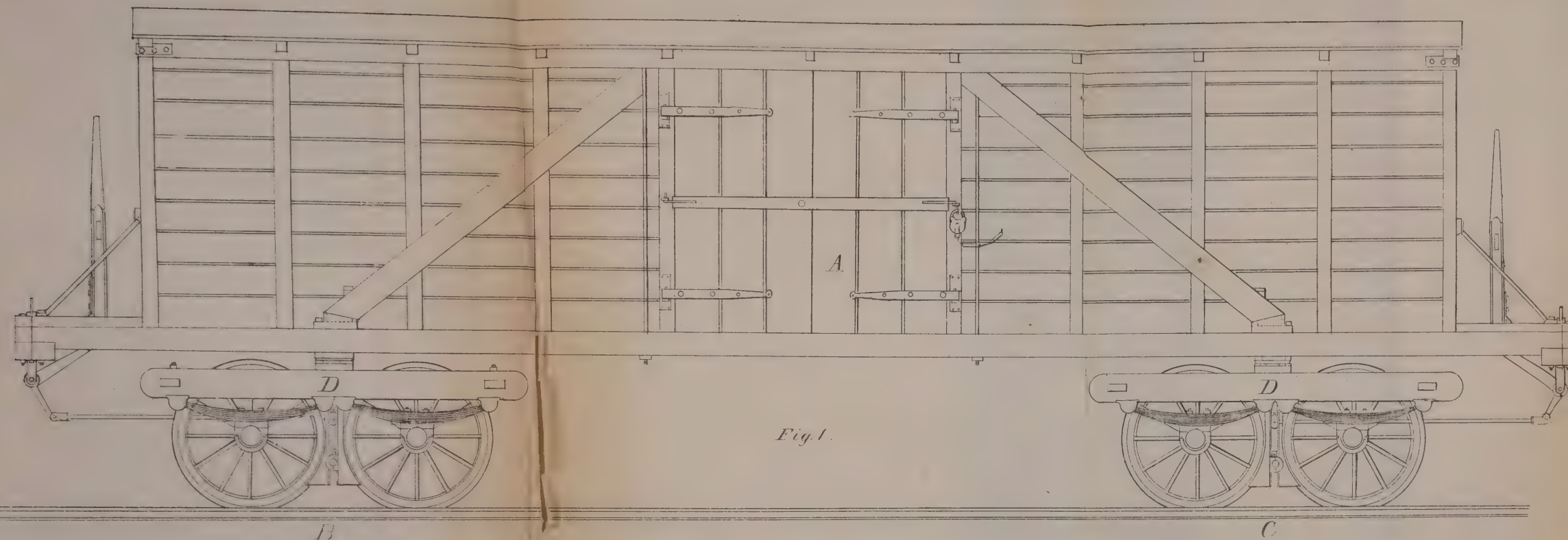
(Filed Sept. 1, 1851.)

I hereby certify that the foregoing is a true copy of an opinion by his Hon. Mr. Justice Nelson, filed with me the first day of September, 1851.

SAMUEL BLATCHFORD,

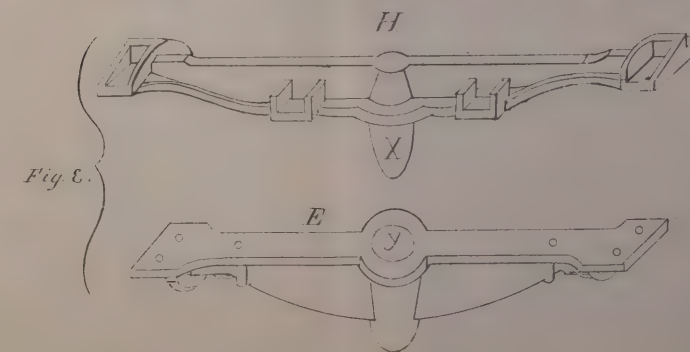
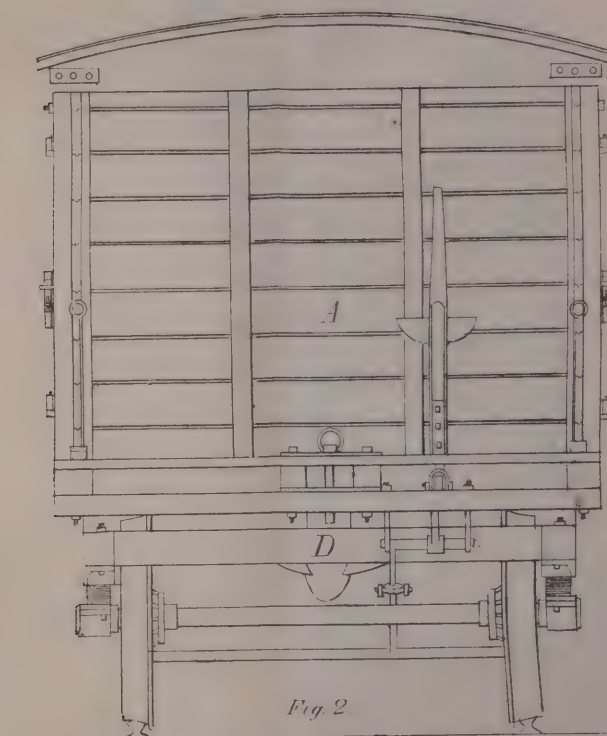
*Reporter of the Circuit Courts of the United States
within the Second Circuit.*

Ross Winans Impt. in the construction of cars or carriages intended to run on Rail Roads.

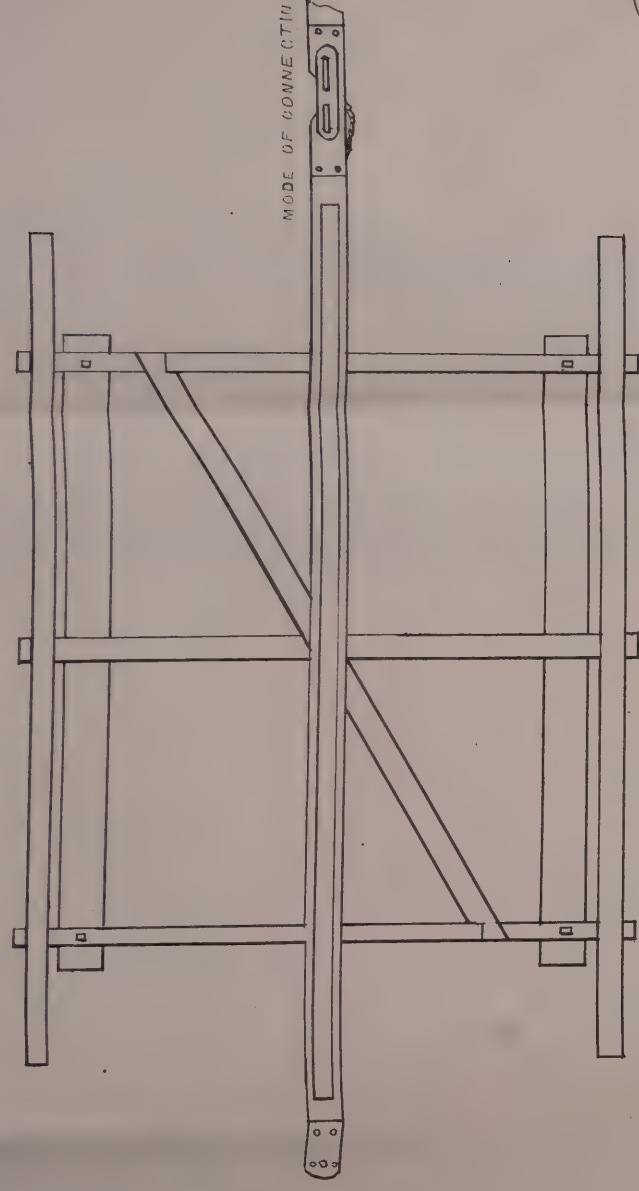


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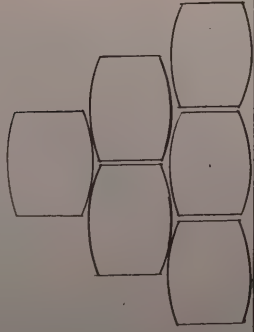


PLAN OF THE FRAME ON WHICH THE CAR BODY RESTS
 SCALE OF $\frac{1}{4}$ INCH TO THE FOOT



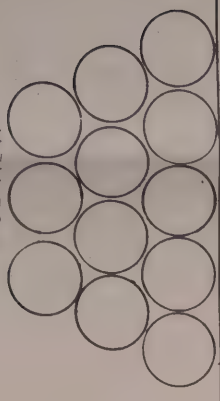
MODE OF CONNECTING THE CARS OF A TRAIN

END VIEW



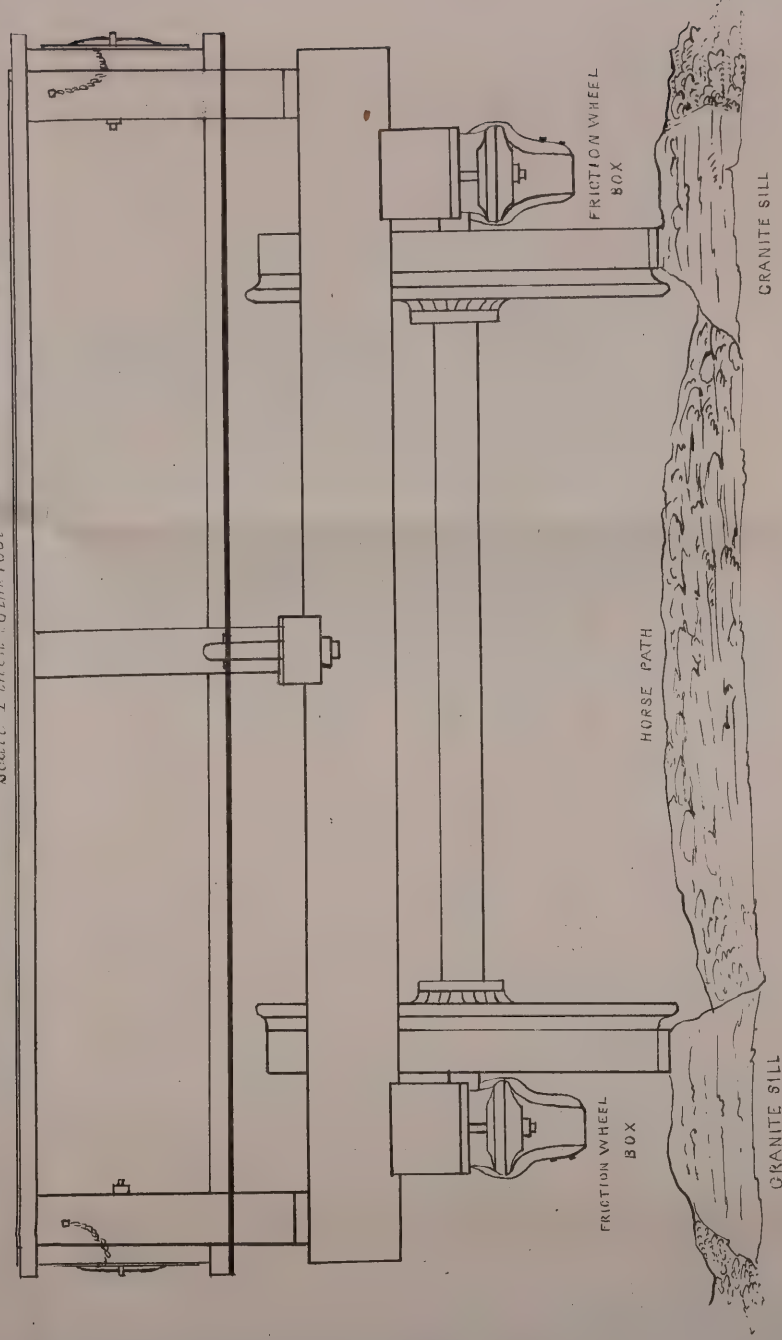
MODE OF STOWING BARRELS IN A CAR

SIDE VIEW



MODE OF STOWING BARRELS IN A CAR

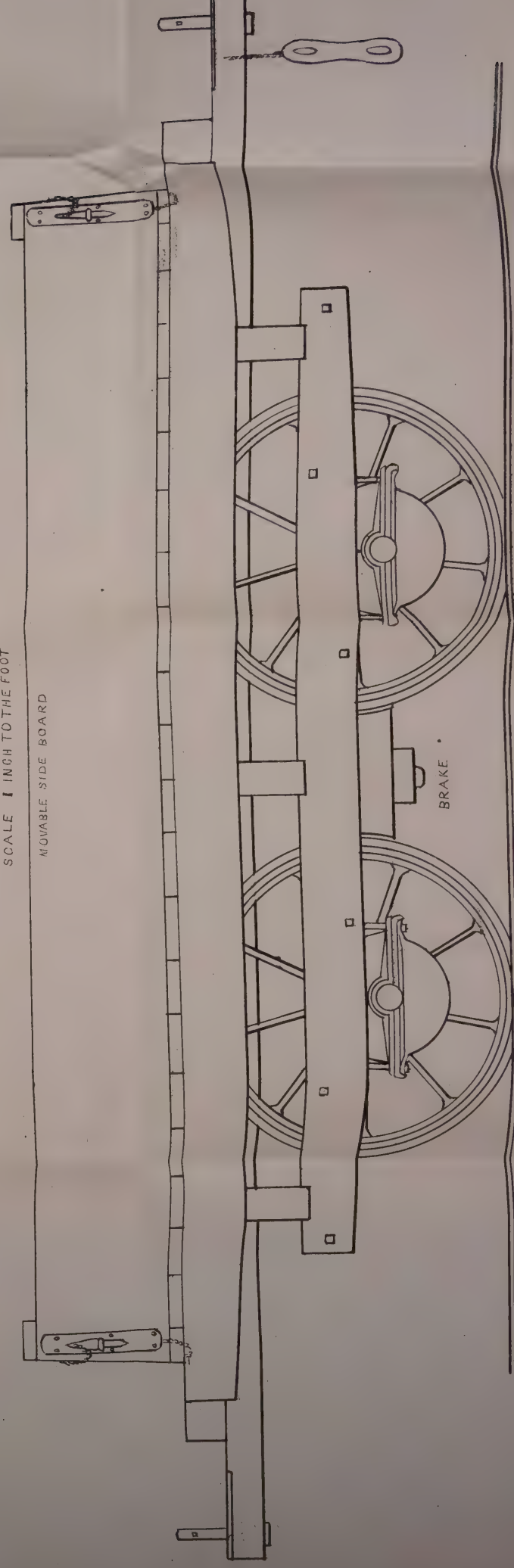
END VIEW OF THE CAR
 Scale 1 inch to the foot



SIDE VIEW OF THE CAR

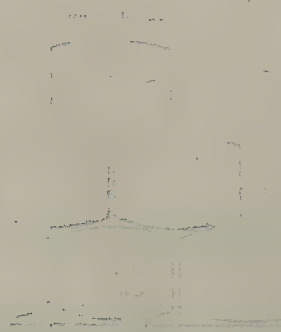
SCALE 1 INCH TO THE FOOT

MOVABLE SIDE BOARD

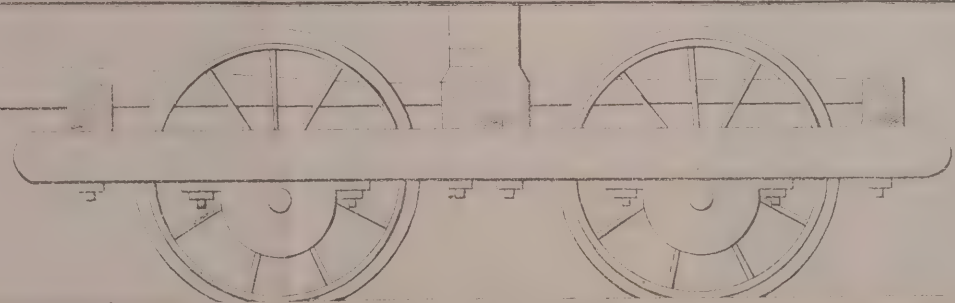
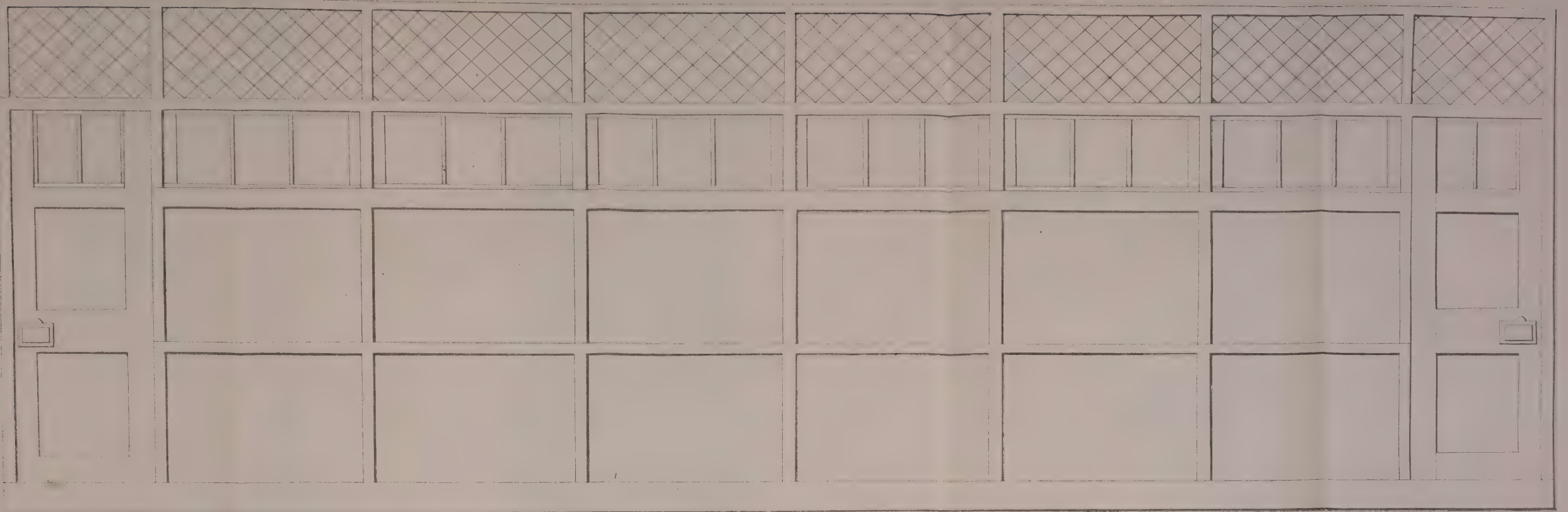


C A R

USED FOR THE TRANSPORTATION OF
FLOUR
 ON THE BALTIMORE AND OHIO RAIL ROAD

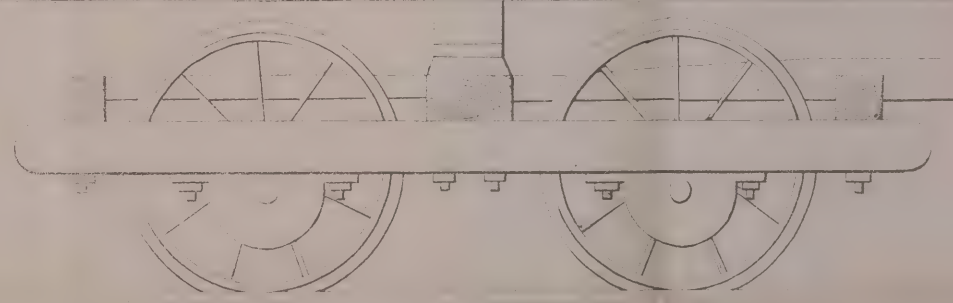


THESE ARE THE RESULTS

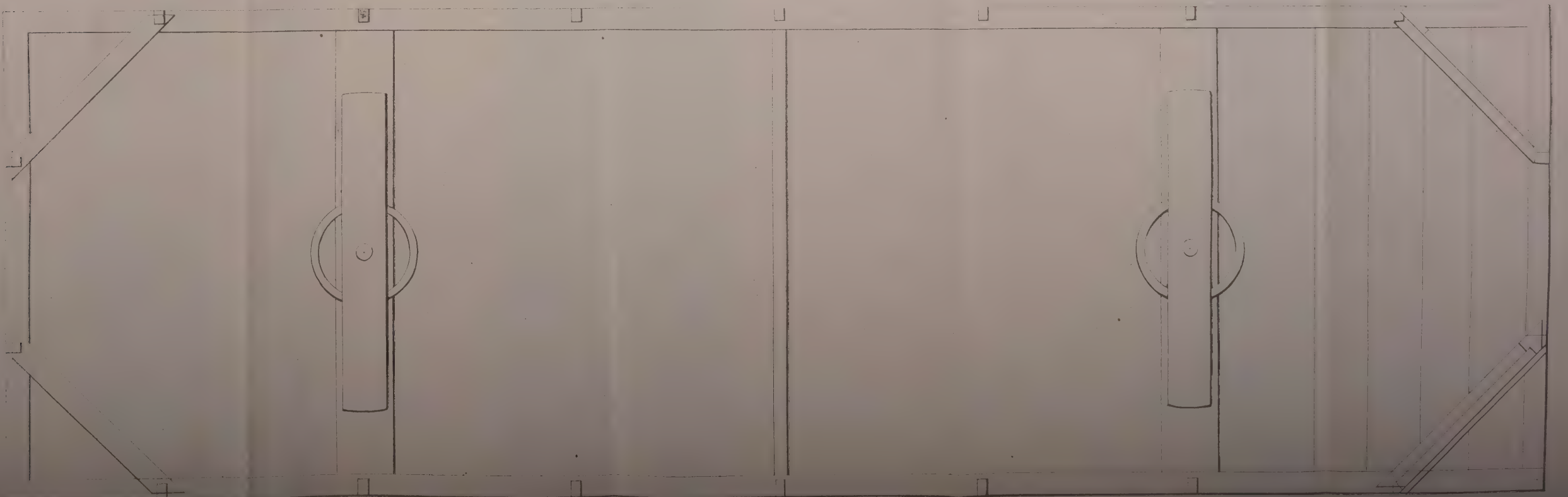


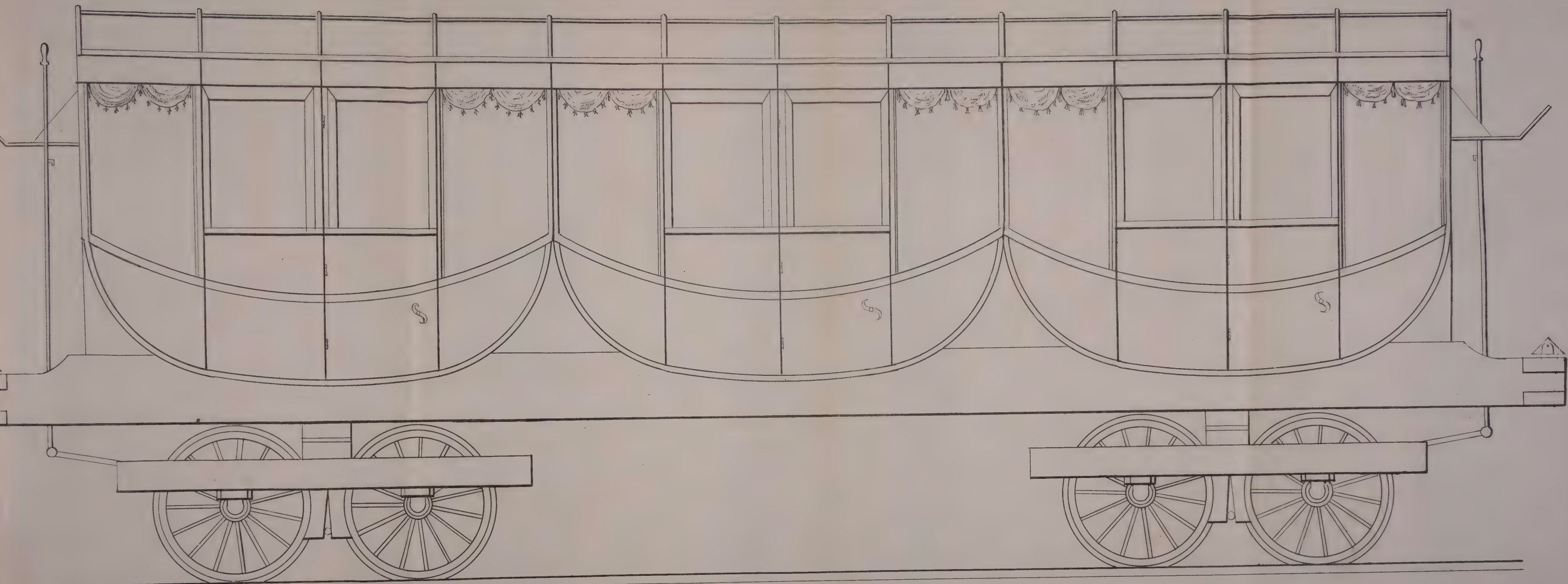
Rep. W. W. W. }
 The Eastern Rail }
 Road Company }

Plaintiff's Exhibit No. 4, referred to in the
 deposition of witnesses Galitz Leonard Ferrell and
 John M. Eschbacher taken before
 Alvin Galitz Com.

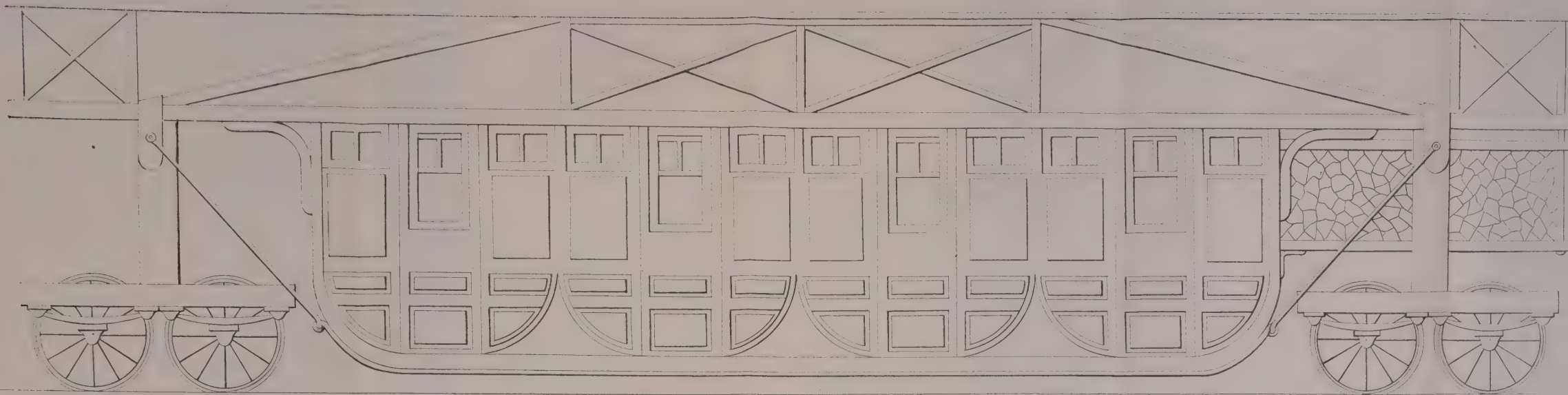


Plaintiff's Exhibit No. 4
 C. Galitz
 John M. Eschbacher
 Leonard Ferrell









Detail of a horse-drawn carriage

